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Note

Establishing an “Injury-in-Fact” through Valuations of Ecosystem Services: Putting It in Terms Federal Courts Understand

*Allie Jo Mitchell**

INTRODUCTION

Environmental public interest organizations, conservationists, and those seeking to vindicate nature for human-caused damages know all too well the difficulties that lie in seeking justice in the American court system. Environmental harms, like air pollution, are often diffuse, making it difficult to trace the harm back to its source or properly apportion fault.¹ Causation is also difficult to establish in cases where the environmental damage occurs years or decades later.² Furthermore, environmental harms may injure hundreds of thousands of people, or in the case of climate change, the entire world.³

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1. See Adam D.K. Abelkop, *Tort Law as an Environmental Policy Instrument*, 92 OR. L. R. 381, 404–05 (2013) (describing the problem of the diffuse harms on indeterminate plaintiffs that cannot ascertain the harm attributable to any one defendant); see also *id.* at 407 (illustrating the problem of a diffuse-origin externality like CO₂ emissions on plaintiff’s ability to establish both general and specific causation).

2. See *id.* at 400 (raising the issue of latent toxicological harms that are often “removed in both time and space from the defendant’s risky activity.”).

3. See *id.* at 405 (highlighting three difficulties that arise from diffuse-harm externalities that affect a large number of people: (1) aggregate damage

Despite all of these difficulties, one important doctrine works to keep environmental lawsuits out of U.S. federal courts altogether—Article III standing. By restricting federal court jurisdiction to only “cases or controversies,” the standing doctrine works as a bar to plaintiffs who are unable to allege an injury-in-fact that is causally related to the defendant’s conduct and is redressable by a favorable decision of the court.⁴ To meet this initial hurdle, different standing theories have emerged from case law and scholarship, although each has proven to have its own limitations and drawbacks.⁵

The jurisdictional limits placed on the judiciary exist to protect the executive and legislative branch from usurpation by the only unelected branch of government.⁶ Notwithstanding these valid concerns, federal courts have a “virtually unflagging obligation” to exercise the jurisdiction given to them⁷ as the branch of government tasked with the protection of the rights and privileges of the people.⁸ In contravention of this duty, the standing doctrine has proven incredibly effective at preventing environmental plaintiffs from obtaining their due justice in the federal court system.⁹ Because of this, vindication for public

may be great but individual harm may be small; (2) high transaction costs; (3) collective action hurdles).

4. See, e.g., *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560 (1992) (articulating the three requirements under the standing doctrine).

5. See *infra* Part I.C.

6. Compare THE FEDERALIST NO. 78 (Alexander Hamilton), at ¶ 9 (“[L]iberty can have nothing to fear from the judiciary alone, but would have everything to fear from its union with either of the other departments . . .”), with Abraham Lincoln, First Inaugural Address (Mar. 4, 1861) (“[T]he candid citizen must confess that if the policy of the government, upon vital questions affecting the whole people is to be irrevocably fixed by decisions of the Supreme Court . . . the people will have ceased to be their own rulers, having to that extent practically resigned their government into the hands of that eminent tribunal.”).

7. *Colo. Water Conservation Dist. v. U.S.*, 424 U.S. 800, 817 (1976).

8. See *Marbury v. Madison*, 5 U.S. 137, 163 (1803) (“The government of the United States has been emphatically termed a government of laws, and not of men. It will certainly cease to deserve this high appellation, if the laws furnish no remedy for the violation of a vested legal right.”).

9. See Marisa A. Martin & James Landman, *Standing: Who can Sue to Protect the Environment?*, 19 A.B.A. INSIGHTS (Dec. 17, 2018), https://www.americanbar.org/groups/public_education/publications/insights-on-law-and-society/insights-vol-19-issue-1/standing—who-can-sue-to-protect-the-environment/ (“In practice, however, developing a principled basis upon which standing can be demonstrated has proven to be extremely difficult,

interest and collective environmental rights has shifted “to the more steeply pitched fields of state courts or the political process.”¹⁰

This Note proposes a new tool in the environmental standing arsenal for plaintiffs seeking to “fight the good fight”¹¹ on behalf of the natural world—ecosystem service valuations (ESVs). Ecosystem services first made a splash in the late 1990s as an attempt to illustrate and link the benefits human society receives from the natural world.¹² The applications and uses for ecosystem services has expanded greatly since then, including the ability to determine the monetary value ecosystem services provide.¹³ By using existing models, valuation techniques, and platforms, litigators can now more easily link environmental harms to actual or imminent and concrete and particularized injuries to humans to overcome the burden of establishing an injury-in-fact.

Part I of this Note introduces the relevant background information on the standing doctrine, ecosystem services, and the valuation of these ecosystem services. This section will first explain how standing requirements were judicially developed through the Case or Controversy Clause in Article III of the Constitution. Next, Part I will explore the difficulties environmental plaintiffs have faced meeting these standing requirements. This Note will use the seminal cases *Lujan v. Defenders of Wildlife* and *Sierra Club v. Morton* as examples and give an overview of three commonly proposed environmental standing theories: (1) the traditional standing theory; (2) the ecosystem nexus theory; and, (3) the intrinsic value of nature

especially for those cases involving environmental issues.”); see also *Access to Justice*, BLACK’S LAW DICTIONARY (10th ed. 2014) (“The ability within a society to use courts and other legal institutions effectively to protect one’s rights and pursue claims. — Also termed *access to the courts*.”).

10. Evan Tsen Lee, *Deconstitutionalizing Justiciability: The Example of Mootness*, 105 HARV. L. REV. 603, 606 (1992).

11. John Samuel Bewley Monsell, *Fight the Good Fight*, in HYMNS OF LOVE AND PRAISE FOR CHURCH’S YEAR (1863).

12. See James Salzman, *Valuing Ecosystem Services*, 24 ECOLOGY L.Q. 887, 888 (1997) (“Although awareness of ecosystem services dates back to Plato, only recently have ecologists and economists begun systematically examining the contribution of ecosystem services to social welfare.”).

13. Cf. Paul Sutton, *Can You Put a Dollar Value on Nature*, WORLD ECON. F. (Mar. 6, 2015), <https://www.weforum.org/agenda/2015/03/can-you-put-a-dollar-value-on-nature/> (explaining how and why attempts have been made to put a dollar value on nature).

theory. Part I will conclude with an overview of ecosystem services, ESV methods, and the application of ecosystem services and standing in the law today.

Part II considers the limitations of the three commonly proposed environmental standing theories (traditional, ecosystem nexus, and “intrinsic value of nature” theories). This section will then propose the use of ESVs as a tool to meet Article III injury-in-fact standing requirements. Part II will conclude by applying the proposed ESV methodology to cases that failed under each one of the commonly proposed standing theories: traditional, ecosystem nexus, and “intrinsic value of nature.”

I. BACKGROUND

This Part introduces the standing doctrine and ecosystem services. Section A explores the rise of the standing doctrine and articulates the three judicially developed elements a plaintiff must meet to bring a lawsuit in federal court. Section B provides a summary of landmark cases in the environmental standing field. Section C discusses three theories advanced in scholarship and case law to establish standing in environmental lawsuits. Section D explains what ecosystem services are and how to value them using ecosystem service assessments, also known as ecosystem service valuations. Section E concludes Part I with a discussion on the current application of ecosystem services in the law today.

A. ARTICLE III AND THE “CASE OR CONTROVERSY” STANDING REQUIREMENTS

The standing doctrine is employed by federal courts to determine whether it has power, or jurisdiction, to hear the plaintiff's case.¹⁴ It derives from the Constitution's limit of federal court jurisdiction to only “cases and controversies.”¹⁵ Many courts and scholars have interpreted this restriction as a derivative of separation of powers principles.¹⁶ As Alexander

14. See Francisco Benzoni, *Environmental Standing: Who Determines the Value of Other Life?*, 18 DUKE ENVTL. L. & POL'Y F. 347, 356 (2008) (explaining that a federal court's jurisdiction can be invoked when the plaintiff meets federal standing requirements).

15. U.S. CONST. art III, § 2 (extending federal judicial power to certain “cases” or “controversies”).

16. See Brian A. Stern, *An Argument Against Imposing the Federal Case or Controversy Requirement on State Courts*, 69 N.Y.U. L. REV. 77, 92 (1994) (“By

Hamilton argued in the Federalist Papers, separation of the judiciary power from the legislative and executive powers was necessary to prevent against the rise of a monarchy.¹⁷

In order to protect the separation of powers principles at play in the Case or Controversy Clause, the Judiciary developed minimum requirements that must be met for a plaintiff to bring a lawsuit in federal court.¹⁸ This came to be known as the standing doctrine and is considered by federal courts as "constitutionally required and jurisdictional in nature."¹⁹ Standing is often interpreted as a limitation on the judiciary's power, ensuring that federal courts do not preside over an issue that is better suited for remedy by the legislative or executive branch.²⁰

The modern standing requirements were first articulated by the Supreme Court in the 1970s in a series of cases²¹ and highlighted in the seminal standing case *Lujan v. Defenders of*

limiting their sphere of action to cases and controversies, federal courts respect the separation of powers by not interfering unnecessarily with the other branches of government."); see also *Sierra Club v. Morton*, 405 U.S. 727, 740 (1972) (explaining that standing protects against "judicial review at the behest of organizations or individuals who seek to do no more than vindicate their own value preferences through the judicial process.").

17. See THE FEDERALIST NO. 78 (Alexander Hamilton), at ¶ 9 ("For I agree, that 'there is no liberty, if the power of judging be not separated from the legislative and executive powers.'") (quoting MONTESQUIEU, SPIRIT OF LAWS 181 (1748)).

18. See *Camreta v. Greene*, 563 U.S. 692, 701 (2011) ("Article III of the Constitution grants this court authority to adjudicate legal disputes only in the context of 'Cases' or 'Controversies.'").

19. See Evan Tsen Lee & Josephine Mason Ellis, *The Standing Doctrine's Dirty Little Secret*, 107 NW. U. L. REV. 169, 186 (2012) (citing *Hein v. Freedom from Religion Found., Inc.*, 551 U.S. 587, 611 (2007) ("The constitutional requirements for federal-court jurisdiction—including the standing requirements and Article III—are an essential ingredient of separation and equilibration of powers.")) (quoting *Steel Co. v. Citizens for a Better Env't*, 523 U.S. 83, 101 (1998)).

20. See Stern, *supra* note 16, at 93 ("Article III defines the role of the federal courts, and thereby prevents those courts from exercising powers more properly left to the legislative and executive branches . . .").

21. See Lee & Ellis, *supra* note 19, at 175–76 (listing Supreme Court opinions from the 1970s that expounded standing requirements including *Simon v. E. Ky. Welfare Rights Org.*, 426 U.S. 26, 39–44 (1976), *Warth v. Seldin*, 422 U.S. 490, 494–504 (1975), and *Linda R.S. v. Richard*, 410 U.S. 614, 616–18 (1973)).

Wildlife.²² Ultimately, to confer standing a plaintiff must assert an injury-in-fact (which the Court articulated as the invasion or violation of a legally protected interest), there must be causal connection between the plaintiff's injury and the defendant's conduct complained of, and the injury must be capable of being redressed by a favorable decision.²³ These three elements can be summarized as: (1) injury-in-fact; (2) causation; and (3) redressability.²⁴ Although the causation and redressability prong are important elements to the standing doctrine and have kept many environmental lawsuits out of court, they are outside the scope of this Note.²⁵

i. Injury-in-Fact

The Supreme Court has provided additional guidance regarding what an injury-in-fact must entail. According to *Lujan*, an injury-in-fact must be "concrete and particularized" (as opposed to a generalized grievance) and "actual or imminent" (not conjectural or hypothetical).²⁶ This essentially puts the burden on the plaintiff to demonstrate that the injury is personal to them and has either already occurred or is "imminent."²⁷ Suits have been withheld from court under the "actual or imminent" requirement for being either temporally deficient (the harm will occur too far in the future) or too conjectural (there is not a sufficient probability of the harm occurring).²⁸ "With respect to

22. 504 U.S. 555, 560–61 (1992).

23. *Id.*

24. See Lee & Ellis, *supra* note 21, at 176 ("[T]he [Supreme] Court made it clear that Article III requires a plaintiff to demonstrate three things in order to maintain any action in federal court: injury-in-fact, causation, and redressability.").

25. There is expansive scholarship in this field, including research on ways ecosystem services can be used to prove proximate causation in environmental tort suits. See, e.g., Sanne H. Knudsen, *The Long-Term Tort: In Search of a New Causation Framework for Natural Resource Damages*, 108 NW. L. REV. 475, 480–84 (2014) (explaining the difficulties in proving causation for natural resource damages and advocating for a new remedy for long-term ecological injuries, adoption of a lenient version of the substantial factor test).

26. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560 (1992).

27. See *Attias v. Carefirst, Inc.*, 865 F.3d 620, 625 (D.C. Cir. 2017) ("[T]he burden [to show standing] grows as the litigation progresses.").

28. See *Fero v. Excellus Health Plan, Inc.*, 236 F. Supp. 3d 735, 753 (W.D.N.Y. 2017) (finding that plaintiffs that were victims of a data breach but had yet to experience any misuse of their personally identifiable information did not have an imminent or "certainly impending" harm arising from an increased risk of future injury); see also Lee & Ellis, *supra* note 19 at 176–80

injury in fact, '[t]he relevant showing for purposes of Article III standing . . . is not injury to the environment but injury to the plaintiff.'"²⁹

Recently, in *Spokeo, Inc. v. Robins* the Supreme Court confirmed that the "concrete" factor of injury-in-fact must be *de facto* (actually exist) and not "abstract."³⁰ Therefore, a mere procedural violation of a statute without a *de facto injury* will not establish Article III standing.³¹ However, the Court also confirmed that an injury can be intangible and that "history and the judgment of Congress play important roles" in determining whether an intangible harm constitutes injury in fact.³² Allegations of a mere procedural violation often come up in environmental lawsuits when a plaintiff attempts to bring a claim under a citizen suit provision of a federal statute.³³ The Endangered Species Act (ESA) contains such a provision, which grants the public the right to sue defendants for violation of the statute.³⁴ However, federal courts have refused to adjudicate ESA citizen suit cases if the plaintiff lacks an *actual* injury and can only raise a procedural violation of the statute.³⁵

The "showing of [an] individual injury has proven to be the most difficult element for environmental activists to show

(explaining the Supreme Court's interpretation of the "concrete and particularized" and "actual or imminent" injury-in-fact requirements).

29. Pub. Emps. for Envtl. Responsibility v. Schroer, No. 3:14-cv-589-HBG, 2017 WL 943942, at *5 (E.D. Tenn. 2017) (citing *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs., Inc.*, 528 U.S. 167, 181 (2000)).

30. 136 S.Ct. 1540, 1548 (2016).

31. *Id.* at 1549.

32. *Id.* at 1549 ("Congress may 'elevat[e] . . . injuries that were previously inadequate in law.'") (quotation omitted).

33. See, e.g., *Navajo v. Dep't of Interior*, 876 F.3d 1144, 1161–62 (9th Cir. 2017) (explaining the procedural protections granted under the National Environmental Policy Act) ("NEPA"); *Wildearth Guardians v. U.S. Dep't. of Agric.*, 795 F.3d 1148, 1154 (9th Cir. 2015) (analyzing plaintiff's standing to bring a procedural claim for a violation of NEPA).

34. 16 U.S.C. § 1540(g)(1)(A) (2012) ("Except as provided in paragraph (2) of this subsection any person may commence a civil suit on his own behalf . . . to enjoin any person, including the United States and any other governmental instrumentality or agency . . . who is alleged to be in violation of any provision of this chapter or regulation issued under the authority thereof . . .").

35. See *Nat'l Ass'n of Home Builders v. U.S. Fish & Wildlife Serv.*, 34 F. Supp. 3d 50, 60 (2014) (citing *Fla. Audubon Soc. v. Bentsen*, 94 F.3d 658, 667 (D.C.Cir.1996) ("To establish standing to challenge the Service's failure to abide by a statutory procedure, Plaintiffs must show that the procedures in question are "designed to protect some threatened concrete interest" of their members.")).

during the litigation process” as many environmental harms affect a vast array of individuals.³⁶ However, despite this difficulty courts have found that an injury-in-fact may stem from environmental harms that impact many individuals. For example, in *Sierra Club v. Morton*, the Court held that injury-in-fact could include harm to the aesthetics of nature so long as the plaintiff had personally visited the place in question to enjoy its beauty.³⁷ Justice Stewart also warned against denying plaintiffs standing just because the harm impacts a large number of people in *United States v. Students Challenging Regulatory Agency Procedures*.³⁸

It is important to note that the judicially-developed Article III standing requirements only apply to federal courts.³⁹ State courts are not bound by the federal constitutional mandate that restricts federal court jurisdiction to only “cases or controversies.”⁴⁰ Instead, each state court’s jurisdictional limits are defined either by the state’s constitution or other state legislation.⁴¹ While federal courts can only hear cases or controversies, state courts can hear anything their legislature grants them jurisdiction to adjudicate over.⁴² This Note only addresses the standing requirements of federal courts.

36. Trayce A. Hockstad, *Rats and Trees Need Lawyers Too: Community Responsibility in Deodand Practice and Modern Environmentalism*, 18 VT. J. ENVTL. L. 105, 118 (2016).

37. 405 U.S. 727, 734–35 (1972).

38. 412 U.S. 669, 687 (1973) (“But we have already made it clear that standing is not to be denied simply because many people suffer the same injury.”).

39. See *ASARCO Inc. v. Kadish*, 490 U.S. 605, 617 (1992) (“[S]tate courts are not bound to adhere to federal standing requirements . . .”).

40. *Id.* (“We have recognized often that the constraints of Article III do not apply to state courts, and accordingly the state courts are not bound by the limitations of a case or controversy or other federal rules of justiciability even when they address issues of federal law . . .”).

41. See Calvin Massey, *Standing in State Courts, State Law, and Federal Review*, 53 DUQ. L. REV. 401, 404–05 (2015) (“[S]tates are free to set their own standing rules independent of the Article III limits on standing applicable to federal courts . . .”) (citation omitted).

42. *Id.* at 409 (explaining that a state legislature could expand standing by authorizing any citizen to assert a generalized grievance in state court).

B. LANDMARK CASES ON ENVIRONMENTAL STANDING

Many environmental cases have lost based on a failure to establish standing.⁴³ As the Environmental Law Practice Guide states, “[s]tanding to institute a legal action is a vital issue in environmental litigation, where plaintiffs often lack the pecuniary injury that furnishes standing in most civil litigation.”⁴⁴ This note will discuss two landmark cases that have shaped the field of environmental standing: *Lujan* and *Sierra Club*. Later this Note will use the fact pattern in *Lujan* to demonstrate how the plaintiffs may have been able to allege a more concrete and colorable standing argument by using an ESV methodology.

i. *Sierra Club v. Morton*

Sierra Club v. Morton is a formative case that centered around the Disney company’s plans to turn Mineral King Valley, a scenic wilderness area in the Sequoia National Forest designated as a national game refuge, into a mega ski resort.⁴⁵ The Forest Service approved Disney’s plan in 1969 under what would be a 30-year use permit from the Forest Service.⁴⁶ Following this, Sierra Club sued “as a membership corporation with ‘a special interest in the conservation and the sound maintenance of the national parks, game refuges and forests’” and sought a declaratory judgment that various aspects of the proposed development violated federal laws and regulations protecting national parks, forests, and game refuges.⁴⁷ The Sierra Club centered its right to challenge the Forest Service’s action under the citizen suit provision of the Administrative Procedure Act (APA) which reads “[a] person suffering legal wrong because of agency action, or adversely affected or

43. See William Blake Ogden, *Improving Standing Doctrine to Better Protect the Environment: How the United States Can Learn from Ecuador’s Rights of Nature*, 46 GA. J. INT’L & COMP. L. 1, 2 (“Standing requirements are viewed as the ‘most persistent constitutional quandary for environmental law.’”) (citing Holly Doremus, *The Persistent Problem of Standing in Environmental Law*, 40 ENVTL. L. REP. NEWS & ANALYSIS 10956 (2010)).

44. PHILLIP WEINBERG, ENVIRONMENTAL LAW PRACTICE GUIDE § 11B.03(1) (Michael B. Gerrard ed., Matthew Bender) (2018).

45. 405 U.S. 727, 728–29 (1972).

46. *Id.* at 729.

47. *Id.* at 730.

aggrieved by agency action within the meaning of a relevant statute, is entitled to judicial review thereof.”⁴⁸

The Supreme Court stated the proper inquiry to analyze Sierra Club’s standing to sue was “whether the statute in question [APA] authorizes review at the behest of the plaintiff.”⁴⁹ Based on precedent,⁵⁰ the Court laid out one of the now familiar standing requirements it found the APA required: an “injury in fact.”⁵¹ While the Court acknowledged that harm to scenic, aesthetic, or environmental well-being “may amount to an ‘injury in fact’ sufficient to lay the basis for standing,” it also made clear that the “party seeking review [must] be himself among the injured.”⁵²

That a plaintiff must show a particularized injury to herself, is now well known in the environmental law landscape.⁵³ Because Sierra Club failed to show that any of “its members use[d] Mineral King for any purpose,” or “in any way that would be significantly affected by the proposed actions of the [Forest Service/Disney],” the Court found it had not met federal standing requirements.⁵⁴ Ultimately, Sierra Club failed in its attempt to allege standing based on its status as a “representative of the public” in a case concerning the use of natural resources for the public.⁵⁵ The “representative theory” was in direct opposition to the limitation that federal courts only review cases in which there are parties with direct stakes in the outcome.⁵⁶ *Sierra Club*’s holding had significant ramifications on how, and which, environmental lawsuits were brought in federal court and it created the traditional standing strategy in which environmental nonprofits identify a member of their

48. *Id.* at 732–33 (quoting 5 U.S.C. § 702 (2012)).

49. *Id.* at 732 (citations omitted).

50. *See id.* at 733–34 (citing *Ass’n of Data Processing Serv. Orgs, Inc. v. Camp*, 397 U.S. 150 (1970) and *Barlow v. Collins*, 397 U.S. 159 (1970)).

51. *Id.* at 734.

52. *Id.* at 734–35.

53. *See WEINBERG, supra* note 44, § 11B.03(1)(b) (“In drafting a complaint on behalf of an environmental group, it is becoming critically important to assert definite injury, or impending injury, to members of the group in the most specific terms.”).

54. *Sierra Club*, 405 U.S. at 735.

55. *Id.* at 729, 736, 740.

56. *Id.* at 740.

organization particularly affected by the issue[s] they are challenging.⁵⁷

ii. *Lujan v. Defenders of Wildlife*

Another seminal environmental standing case, decided twenty years after *Sierra Club*, is *Lujan v. Defenders of Wildlife*.⁵⁸ In *Lujan*, plaintiffs were members of the non-profit Defenders of Wildlife ("Defenders").⁵⁹ The plaintiffs challenged a Department of the Interior (DOI) regulation limiting the scope of the Endangered Species Act's consultation requirement to only projects or activities that occurred inside the United States or on the high seas.⁶⁰ Section 7(a)(2) of the ESA requires each federal agency to consult with DOI to ensure "any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence [or habitat] of any endangered species or threatened species."⁶¹ Previously, DOI had interpreted this provision of the ESA as requiring consultation for agency activities both domestically and abroad.⁶² Upon DOI's publication of its new regulation in 1986, the Defenders brought suit seeking a federal court injunction requiring DOI to promulgate a new regulation based on its initial interpretation.⁶³

The Supreme Court focused on two specific plaintiffs, Joyce Kelly and Amy Skilbred, each of whom the Court of Appeals found had a sufficient injury-in-fact to meet standing requirements.⁶⁴ Each plaintiff alleged a risk of future injury stemming from U.S. agencies funding and involvement in dam projects abroad.⁶⁵ The first project of concern was the

57. See, e.g., Lee & Ellis, *supra* note 19, at 188 ("In *Lujan*, the lawyers for Defenders of Wildlife assembled declarations in an effort to surmount this requirement.").

58. 504 U.S. 555 (1992).

59. See *id.* at 559, 563.

60. See *id.* at 558–59 ("A revised joint regulation, reinterpreting § 7(a)(2) to require consultation only for actions taken in the United States or on the high seas, was . . . promulgated in 1986, 51 Fed. Reg. 19926; 50 CFR 402.01 (1991).").

61. See 16 U.S.C. § 1536(a)(2) (incorporating what has come to be known as the consultation requirement).

62. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 558–59 (1992).

63. *Id.* at 559.

64. *Id.* at 563.

65. *Id.*

rehabilitation of the Aswan Dam on the Nile river.⁶⁶ The Aswan Dam threatened the habitat of the endangered Nile crocodile, a species that plaintiff Kelly, a conservation biologist, had observed before and hoped to see again in the future.⁶⁷

The second project of concern was the Mahewali Dam project in Sri Lanka.⁶⁸ Plaintiff Skilbred, who had traveled to the project area of the Mahewali Dam in Sri Lanka to study and observe endangered Asian elephant and leopards, testified that the Dam could “seriously reduce endangered, threatened, and endemic species habitat.”⁶⁹ She went on to conclude that this threat harmed her as she planned on returning to Sri Lanka to observe and study the Asian elephant and leopards in the future.⁷⁰

The Supreme Court focused on the testimony of Kelly and Skilbred and determined that both had failed to demonstrate both an “actual or imminent” and concrete injury.⁷¹ The majority reasoned that even if the agency-funded dams threatened the listed species, plaintiffs affidavits contained no facts showing damage to the species would result in an “imminent” injury to *themselves*.⁷² Justice Scalia opined that both Kelly and Skilbred’s affidavits, which professed general intentions to return to Egypt and Sri Lanka to observe and study the endangered species instead of concrete or specific plans to do so, supported a finding that no “actual or imminent” injury had occurred.⁷³

Therefore, the Supreme Court held that although the ESA contained a citizen suit provision, the plaintiffs were still required to allege an injury-in-fact to *themselves* that was actual and imminent and not a generalized grievance.⁷⁴ Under the standing doctrine, injury or harm to a threatened species is not

66. *Id.*

67. *Id.*

68. *Id.*

69. *Id.* (quoting Plaintiff Skilbred’s testimony).

70. *Id.*

71. *Id.* at 564.

72. *Id.*

73. *Id.*

74. *See id.* at 578 (“[Statutory] broadening [of] the categories of injury that may be alleged in support of standing is a different matter from abandoning the requirement that the party seeking review must himself have suffered an injury.”) (citation omitted).

enough without an individual tie or injury to the alleged action.⁷⁵ *Lujan* illustrated the rising burden plaintiffs have to meet to properly allege an injury-in-fact, shifted the way environmental lawsuits were brought, and inspired a new wealth of scholarship specifically addressing environmental standing requirements.⁷⁶

C. ENVIRONMENTAL STANDING PROPOSALS TO DATE

The difficulty environmental plaintiffs face in establishing standing has spurred a vast array of legal scholarship. For example, a Westlaw search for the term "environmental standing" shows a return of 436 law review and journal articles. Three common theories discussed in this scholarship are explained below: first the traditional standing theory, second the ecosystem nexus theory, and third the intrinsic value of nature theory.

i. Traditional Standing Theory

What this Note will call the traditional standing theory was established after *Sierra Club v. Morton*.⁷⁷ Public interest organizations, like Sierra Club or Defenders of Wildlife, look for members of its organization that will be personally and adversely affected by a federal action or that have already faced environmental harm from a third party.⁷⁸ Examples of common

75. See *id.* at 567 ("It goes beyond the limit, however, and into pure speculation and fantasy, to say that anyone who observes or works with an endangered species, anywhere in the world, is appreciable harmed by a single project affecting some portion of the species with which he has no more specific connection.").

76. A Westlaw search for secondary sources with *titles* including "*Lujan v. Defenders of Wildlife*" returned twenty-four law review and journal articles, one CLE & seminar material, and one text & treatise.

77. See Bradley James Larsen, *Meeting the Requirements of Standing: A Framework for Environmental Interest Groups: Lujan v. National Wildlife Federation*, 110 S. Ct. 3177 (1990), 14 HAMLINE L. R. 277, 297-98 (1990) (explaining a framework for environmental litigators to follow to allege standing including: (1) find an individual whose aesthetic, recreational, or environmental interests have actually been harmed; (2) follow *Sierra Club v. Morton* as a guideline and show that the plaintiff "use[s] the land for aesthetic or recreational purposes such as hiking, hunting, and bird watching" and; (3) redress each harm on a case-by-case basis); see also WEINBERG, *supra* note 44, § 11B.03 (providing a guideline for practitioners seeking to establish standing in an environmental lawsuit in federal court).

78. See Larsen, *supra* note 77, at 297 ("[T]ime and money should be spent on finding this individual [injured plaintiff] instead of wasting valuable

suits in this area include members that will be harmed based on a loss of recreation or aesthetic values from human development or extraction in a national forest,⁷⁹ a conservationist or biologist whose career will be negatively impacted by an adverse agency action,⁸⁰ or an individual whose property or health have been harmed from environmental degradation (e.g. fisherman who lost income following the Exxon Valdez oil spill).⁸¹ Public interest organizations will then allege an injury tied to its particular member's career, hobby, interest, health, or property.⁸²

Although in many environmental lawsuits it is not difficult to find a plaintiff to meet these requirements, that is not always the case. For example, in *Lujan*, based on the holding in *Sierra Club*, Defenders of Wildlife attempted to find members of their organization who were personally aggrieved by DOI's action.⁸³ However, the Supreme Court found that the members' affidavits failed to allege a sufficient injury-in-fact because they could not establish *when* they would be harmed without any concrete plans to return to the areas of concern.⁸⁴ Because of these

resources bringing an action based on an individual whose connection to the public land is tenuous at best.”).

79. See e.g., *Sierra Club v. Hardin*, 325 F. Supp. 99, 102–03 (D. Ala. 1971) (reviewing lawsuit to enjoin sale of timber in Tongass National Forest brought by, among other plaintiffs, “eighty Sierra Club members, many of whom enjoy the timber sale area for scenic and recreational purposes such as hunting, fishing, camping, hiking and canoeing”).

80. See e.g., *Sharps v. U.S. Forest Serv.*, 823 F. Supp. 668, 671, 673 (D.S.D. 1993) (reviewing wildlife biologist's challenge of Forest Service's management of prairie dog populations in the Nebraska National Forest claiming it would result in a loss of swift fox species which he studies).

81. See *In re Exxon Valdez*, 270 F.3d 1215, 1221 (9th Cir. 2001) (analyzing appeal from a \$5 billion punitive damage award stemming from economic harm to commercial fisherman following the Exxon Valdez oil spill in Prince William Sound, Alaska).

82. See e.g., *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 562–63 (1992) (“Of course, the desire to use or observe an animal species, even for purely esthetic purposes, is undeniably a cognizable interest for purpose of standing. ‘But the ‘injury in fact’ test requires more than an injury to a cognizable interest. It requires that the party seeking review be himself among the injured.”) (quoting *Sierra Club v. Morton*, 405 U.S. 727, 734 (1972)).

83. See e.g. *Lee & Ellis*, *supra* note 19, at 188 (“In *Lujan*, the lawyers for Defenders of Wildlife assembled declarations in an effort to surmount this requirement [set in *Morton*.]”).

84. *Lujan*, 504 U.S. at 564 (“Such ‘some day’ intentions—without any description of concrete plans, or indeed even any specification of *when* the some

inherent limitations, plaintiffs and scholars have pushed for the courts to accept other theories of standing.

ii. Ecosystem Nexus

In *Lujan*, attorneys for the plaintiffs went a step beyond the traditional method and attempted to allege standing based on an ecosystem nexus theory. As the brief describes it,

Defenders possesses standing based upon the injury suffered by its members who use and enjoy any part of a *contiguous ecosystem* affected by federal action for purposes of studying or observing endangered species located in that ecosystem, even if the federal agency action which is damaging those interests is located some distance away from the tracts used by Defenders' members.⁸⁵

The theory held that because the international projects would have ripple effects across the ecosystems in which they were to be built, the plaintiffs could assert an injury based on the harm that would occur in a remote unvisited area of the ecosystem.⁸⁶ Even if this remote area was not directly tied to the plaintiff's interest, harm to the remote area would ultimately affect the *entire* ecosystem, including the portion on which the plaintiffs claimed a particularized interest.⁸⁷ Therefore, Defenders attempted to link the degradation of one portion of the ecosystem to a substantial likelihood that one of the member plaintiffs particularized interest would be harmed.⁸⁸

Justice Scalia dismissed this premise as a "novel" and "inelegantly styled" standing theory.⁸⁹ In the Court's view, the ecosystem nexus theory was not aligned with precedent that held "a plaintiff claiming injury from environmental damage

day will be—do not support a finding of the 'actual or imminent' injury that our cases require.").

85. Brief for the Respondents, *Lujan v. Defs. of Wildlife*, 504 U.S. 555 (1992) (No. 90-1424), 1991 WL 577004, at *27 (Aug. 30, 1991) (emphasis added).

86. *Id.* at *28 (providing plaintiff's testimony that "[t]he area that I visited and the area of the Picchis-Palcazu project are contiguous areas of tropical moist forest and reducing the population in one area affects the population in its entirety").

87. *See id.* (arguing that the "level of generality at which injury can occur" is the ecosystem level based on the ESA's declaration of purpose in section 2).

88. *Lujan*, 504 U.S. at 565 ("The first, inelegantly styled 'ecosystem nexus,' proposes that any person who uses *any part* of a 'contiguous ecosystem' adversely affected by a funded activity has standing even if the activity is located a great distance away.").

89. *Id.*

must use the area affected by the challenged activity and not an area roughly ‘in the vicinity of it.’”⁹⁰ Although the ESA’s stated purpose was to conserve ecosystems upon which endangered and threatened species depend, the Court did not equate this purpose to granting rights of action in “persons who use portions of an ecosystem not perceptibly affected by the unlawful act in question.”⁹¹

iii. Intrinsic Value of Nature

Another standing theory advanced centers around the idea that nature has intrinsic value and thus should be granted legal rights, the damage of which should be recognized by courts as sufficient to grant standing.⁹² This theory was put forth by Christopher Stone in 1972 in his article *Should Trees Have Standing*.⁹³ Stone argued that natural objects should be appointed lawyers or guardians ad litem to advance their legal rights (as is common practice for children, those deemed “incompetent,” or other non-human entities like corporations, estates, and universities).⁹⁴ Stone’s theory finds support by the works of Aldo Leopold in which he argued for recognition of “the land ethic”—an expansion of traditional ethics beyond humans to include all of the Earth.⁹⁵ “In Leopold’s vision of a land ethic, . . . care for people cannot be separated from care for the land.”⁹⁶

90. *Id.* at 565–66 (citing omitted).

91. *Id.*

92. See Christopher D. Stone, *Should Trees Have Standing?—Toward Legal Rights for Natural Objects*, 45 S. CAL. L. REV. 450, 456 (1972) (proposing that legal rights should be given to natural objects and the natural environment as a whole).

93. See Hockstad, *supra* note 36, at 117 (referencing Stone’s seminal law review article: “it was not until 1972 that this argument [for protection in the form of legal rights] was made for inanimate objects in the environment.”).

94. See Stone, *supra* note 92, at 464.

95. See ALDO LEOPOLD, A SAND COUNTY ALMANAC 238 (1949) (“There is as yet no ethic dealing with man’s relation to land and to the animals and plants which grow upon it The land-relation is still strictly economic, entailing privileges but not obligations.”).

96. See *The Land Ethic*, THE ALDO LEOPOLD FOUND., <https://www.aldoleopold.org/about/the-land-ethic/> (last visited Mar. 5, 2019); see also LEOPOLD, *supra* note 95, at 262 (“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”).

Since 1972, similar scholarship has been produced arguing that nature should be granted standing based on its intrinsic value as opposed to any benefits it confers to an individual. Some of this work has looked outside of the United States to countries that have enacted legislation granting nature standing or have incorporated nature's rights into its constitution. For example, in 2018 William Blake Ogden proposed that the United States should look to Ecuador's Right of Nature⁹⁷ to advance environmental standing doctrine.⁹⁸ Similarly, advocates have argued for legislation resembling New Zealand's that granted the Whangauni River, a sacred river considered an ancestor to the Maori tribe, rights of personhood and appointed a committee to act as guardians for the river.⁹⁹ Closer to home, the White Earth band of Ojibwe recently granted legal rights to wild rice, a native grain in Minnesota that has important cultural and spiritual significance to the tribe.¹⁰⁰

Based on the theory first advanced by Stone—that natural objects should possess legal rights in and of themselves—a lawsuit was recently filed in federal district court listing the Colorado River Ecosystem as a party in its own right.¹⁰¹

97. Ogden, *supra* note 43, at 7–8 (explaining how Article 71–74 of the 2008 Constitution of Ecuador granted legal rights to nature).

98. See CONSTITUCIÓN DE LA REPÚBLICA DEL ECUADOR [CONSTITUTION OF THE REPUBLIC OF ECUADOR], Oct. 20, 2008, arts. 71–74 (granting standing rights to anyone in Ecuador seeking to protect nature and enshrining nature's rights "to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions, and evolutionary processes.").

99. See Mihena Tanasescu, *Rivers Get Human Rights: They Can Sue to Protect Themselves*, SCI. AM. (June 19, 2017), <https://www.scientificamerican.com/article/rivers-get-human-rights-they-can-sue-to-protect-themselves/>; see also *Advancing Legal Rights of Nature: Timeline*; COMMUNITY ENVTL. LEGAL DEF. FUND, <https://celdf.org/rights/rights-of-nature/rights-nature-timeline/> (last updated Jan. 31, 2019).

100. See Jennifer Bjorhus, *Minnesota Tribe Asks: Can Wild Rice Have its own Legal Rights?*, STAR TRIB. (Feb. 9, 2019), <http://www.startribune.com/minnesota-tribe-asks-can-wild-rice-have-its-own-legal-rights/505618712/> ("[T]he state's largest Indian tribe, the White Earth Band of Ojibwe, has passed a tribal law granting wild rice its own enforceable legal rights, much like those enjoyed by American citizens.").

101. See Allison Katherine Athens, *An Indivisible and Living Whole: Do We Value Nature Enough to Grant it Personhood?*, 45 ECOLOGY L. Q. 187, 191, 193 (2018) (explaining attempts to expand legal rights to nature and ultimately arguing that "nature . . . has intrinsic value and thus should be entitled to legal personhood") (citing Stone, *supra* note 92, at 456); see also Complaint at ¶ 4, Colo. River Ecosystem v. Colorado, No. 1:17-cv-02316, 2017 WL 4284548 (D.

Following filing of the lawsuit, attorney Jason Flores-Williams withdrew the complaint after threats of sanctions and disbarment.¹⁰² The Colorado Attorney General issued a statement stating the suit was correctly dismissed with prejudice because “the case itself unacceptably impugned the State’s sovereign authority to administer natural resources for public use, and was well beyond the jurisdiction of the judicial branch of government.”¹⁰³

D. WHAT ARE ECOSYSTEM SERVICES & HOW CAN YOU VALUE THEM?

i. Ecosystem Services

Simply put, ecosystem services are the tangible benefits that ecosystems provide to humans.¹⁰⁴ Defined more specifically by James Salzman in *A Policy Maker’s Guide to Designing Payments for Ecosystem Services* ecosystem services are “the interactions of living organisms with their environment . . . [that] provide both the conditions and processes that sustain human life.”¹⁰⁵ Examples of the ecosystem services required to produce a natural good, like apples, are pollination, pest control, and soil fertility.¹⁰⁶ Other examples of ecosystem services are flood mitigation benefits provided by

Colo. Sept. 25, 2017) (“Through this action, the Plaintiffs are asking this Court to recognize and declare that the Colorado River is capable of possessing rights similar to a ‘person’ . . .”).

102. Athens, *supra* note 101, at 191 (citing Chris Walker, *Attorney to Withdraw Colorado River Lawsuit Under Threat of Sanctions*, WESTWORD (Dec. 4, 2017), <http://www.westword.com/news/colorado-river-lawsuit-to-be-withdrawn-due-to-potential-sanctions-9746311>).

103. Chris Walker, *Attorney to Withdraw Colorado River Lawsuit Under Threat of Sanctions*, WESTWORD (Dec. 4, 2017), <http://www.westword.com/news/colorado-river-lawsuit-to-be-withdrawn-due-to-potential-sanctions-9746311>.

104. See Anna Maria Carcamo, *A New Democratic Approach to Ecosystem Service Valuation: An Experiment in New Hampshire*, YALE ENV’T. REV. (Apr. 23, 2018) (“Ecosystem services are benefits that ecosystems provide to humans.”).

105. JAMES SALZMAN, *A POLICY MAKER’S GUIDE TO DESIGNING PAYMENTS FOR ECOSYSTEM SERVICES* 4 (Aug. 27, 2009); J.B. Ruhl & James Salzman, *The Law and Policy Beginnings of Ecosystem Services*, 22 J. LAND USE & ENVTL. L. 157, 157 (2007).

106. SALZMAN, *supra* note 105.

wetlands¹⁰⁷ or carbon sequestration by forests.¹⁰⁸ Ecosystem services are broken down into four categories under the Millennium Ecosystem Assessment¹⁰⁹:

- (1) provisioning services (products obtained from ecosystems); (2) regulating services (benefits obtained from the regulation of ecosystem processes); (3) cultural services (the non-material benefits that people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences) that directly affect people and; (4) supporting services needed to maintain other services.¹¹⁰

"Ecosystem service valuation [ESV] is a method for assigning economic value" to these ecosystem services.¹¹¹ It is essentially a "methodology for identifying environmental benefits created by ecosystems" and then calculating the monetary value these benefits provide.¹¹² ESVs can help define the monetary benefits an ecosystem service provides to society or, alternatively, the costs or damages that result from the destruction of an ecosystem service.¹¹³

ii. Economic Valuation Approach

Ecosystem services are valued in a variety of ways, but one well-known framework is the economic value approach. The economic value approach measures both use and nonuse values derived from ecosystems.¹¹⁴ Use values include physical

107. See John K. Pattinson-Williams et al., *Wetlands, Flood Control and Ecosystem Services in the Smith Creek Drainage Basin: A Case Study in Saskatchewan, Canada*, 147 *ECOLOGICAL ECON.* 36, 37–38 (2018); J.B. Ruhl & R. Juge Gregg, *Integrating Ecosystem Services into the Law: A Case Study of Wetland Mitigation Banking*, 20 *STAN. ENVTL. L. J.* 365, 366 (2001).

108. SALZMAN, *supra* note 105, at 4.

109. The Millennium Ecosystem Assessment was a global study involving 1,360 experts to assess "the consequences of ecosystem change from human well-being." Five technical volumes and six synthesis reports appraise "the conditions and trends in the world's ecosystems and the services they provide." *About the Millennium Assessment*, MILLENNIUM ECOSYSTEM ASSESSMENT, <https://www.millenniumassessment.org/en/About.html#> (last visited Mar. 5, 2019).

110. SALZMAN, *supra* note 105, at 5.

111. Carcamo, *supra* note 104; see also Sutton, *supra* note 13 (describing recent estimates that put the total global value of ecosystem services (US\$125 trillion) at twice as much as the world's gross domestic product (US\$75 trillion)).

112. Ori Sharon et al., *Ecosystem Services and Judge-Made Law: A Review of Legal Cases in Common Law Countries*, 32 *ECOSYSTEM SERVS.* 9, 16 (2018).

113. See *id.*

114. BRUCE PEACOCK, NAT'L PARK SERV., VALUING ECOSYSTEM SERVICES IN NATURAL RESOURCE DAMAGE ASSESSMENTS 6 (2009),

interactions with ecosystems both currently and in the future and are divided into two subsets consumptive use values and non-consumptive values.¹¹⁵ Consumptive use values include activities like hunting and fishing while non-consumptive use values include activities like wildlife viewing and hiking.¹¹⁶ Non-use values on the other hand are derived independently from any physical interaction with ecosystems.¹¹⁷ For example, the value a person gains from merely knowing that an ecosystem exists or will be preserved.¹¹⁸

Different methods employed to calculate use and nonuse values include; travel cost,¹¹⁹ contingent valuation,¹²⁰ conjoint analysis,¹²¹ and willingness to pay.¹²² In a willingness to pay evaluation an individual will be asked how much they would be

[https://conference.ifas.ufl.edu/aces08/presentations/Acacia5-6/Tuesday/pm/\(2\)%20B%20Peacock.pdf](https://conference.ifas.ufl.edu/aces08/presentations/Acacia5-6/Tuesday/pm/(2)%20B%20Peacock.pdf); see also Sharon et al., *supra* note 112, at 10 (explaining how natural resource economists use both use values and non-use values to consider the economic welfare benefits of nature).

115. PEACOCK, *supra* note 114 at 12–13.

116. *Id.* at 12.

117. *Id.* at 13.

118. See *Ohio v. U.S. Dep't of the Interior*, 880 F.2d 432, 457 (D.C. Cir. 1989) (recognizing non-use values as potentially valid components of damage assessment awards).

119. See Ivana Logar, *Travel-Cost Method*, ENVTL. JUST. ORG., LIABILITIES & TRADE, <http://www.ejolt.org/2013/01/travel-cost-method/> (last visited Mar. 6, 2019) (describing how the travel-cost method can be used to calculate the economic value of environmental goods by measuring the total costs, including time and opportunity costs, that a person will spend to visit a or use the natural good).

120. See Ivana Logar, *Contingent Valuation*, ENVTL. JUST. ORG., LIABILITIES & TRADE, <http://www.ejolt.org/2012/12/contingent-valuation/> (last visited Mar. 6, 2019) (measuring the benefits provided by ecosystem services by asking “representative sample of the concerned local population how much they would have been willing to pay (in the forms of taxes for instance) in order” to receive the services and then “adding these results over the whole population” to get a “monetary representation of the benefits obtained”).

121. See DAVID A. HARPMAN, U.S. DEP'T OF THE INTERIOR, INTRODUCTION TO CONJOINT ANALYSIS FOR VALUING ECOSYSTEM AMENITIES (2008), <https://www.usbr.gov/tsc/techreferences/economics/conjoint/TMEC200803.pdf> (“Conjoint analysis is based on a primary survey of individuals utilizing a carefully designed survey instrument. Respondents are presented with different hypothetical situations, described using their characteristics or attributes and asked either to rank them or choose between them. Using the resultant survey data, the probability that an individual will rank or choose any particular scenario is then estimated. The consumer surplus or net economic value of the amenity can then be derived.”).

122. See PEACOCK, *supra* note 114, at 6.

willing to pay to benefit from an ecosystem service, e.g.—to see the Grand Canyon and enjoy its aesthetic beauty.¹²³ However, because of the varied and wide-ranging figures this question can produce, researches sometimes ask the opposite question—how much an individual would have to be paid never to utilize the ecosystem service—or in the example posed, to never see the Grand Canyon or enjoy its beauty.¹²⁴ Flipped around, this is known as willingness to accept.¹²⁵

iii. Ecosystem Service Valuation Platforms & Tools

There are a variety of resources, platforms, and models that have been developed to assist with ESV.¹²⁶ This Note will refer to these collectively as ESV platforms. The goal of these platforms is to reduce the cost and time to preform full ESVs in order to integrate the true value of ecosystem services into decision making, planning, management, and payment for ecosystem service markets.¹²⁷

These tools utilize publicly accessible environmental data, then model the amount of services provided by a target ecosystem service using coefficients obtained from other studies. Compared to economic valuation models, these tools can provide quick estimation at a large scale, while maintaining a relatively low cost in terms of both time and money.¹²⁸

Examples of some well-known and established ESV platforms are the: Ecosystem Valuation Toolkit from Earth Economics,¹²⁹ Integrated Valuation of Ecosystem Services and

123. See NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., VALUING ECOSYSTEM SERVICES: TOWARD BETTER ENVIRONMENTAL DECISIONMAKING 48 (2005), <https://www.nap.edu/read/11139/chapter/1> (explaining how willingness to pay and willingness to accept are used in economic valuations of environmental goods).

124. See *id.* at 48–49.

125. See *id.* at 49.

126. See generally PAUL BURGESS, SIYU QIN & XIANGYI LI, MANGROVES IN ECUADOR—AN APPLICATION AND COMPARISON OF ECOSYSTEM SERVICES VALUATION MODELS 14 (2015), <https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/9597/Burgess%20Qin%20Li%20MP.pdf?sequence=1> (studying and comparing different ecosystem service valuation models on the market to calculate the value of ecosystem services from Ecuador's mangroves).

127. See *id.* (explaining how the development of tools and models are intended to promote implementation of ESV).

128. *Id.*

129. *Ecosystem Valuation Toolkit*, EARTH ECON., <http://www.eartheconomics.org/ecosystem-valuation-toolkit/> (last visited Mar.

Tradeoffs (InVEST),¹³⁰ and the UN-REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) Programme.¹³¹ These resources can be used by governments, nongovernmental organizations, researchers, or individuals looking to accurately calculate the value of an ecosystem (e.g. a specific river basin) or a particular resource of interest (e.g. coastal shoreline).

A study by Paul Burgess, Siyu Qin, Xiangyi Li compared a number of these platforms by using each to complete an ecosystem services assessment to calculate the value of Ecuador's mangroves. One of the platforms used in the study to calculate the value of blue carbon storage and coastal protection Ecuador's mangroves provided was InVEST.¹³² InVEST was developed by the Natural Capital Project¹³³ and has fifteen different models covering different ecosystem services including carbon storage and sequestration, crop pollination, habitat risk assessment, sediment retention, and coastal vulnerability.¹³⁴ It is a suite of open-source software models that uses maps and spatial data inputs (i.e. amount of crop cover or forest cover) to return "results in either biophysical terms (e.g., tons of carbon

6, 2019) ("Our Ecosystem Valuation Toolkit (EVT) is a comprehensive, searchable database of ecosystem service values. The quantity and quality of our data and the advanced filtering and reporting tools we've developed allow Earth Economics to quickly and reliably generate ecosystem service values for virtually any location and ecosystem in the world.").

130. *What is InVEST*, NAT. CAPITAL PROJECT, <https://naturalcapitalproject.stanford.edu/invest/#what-is-invest> (last visited Mar. 6, 2019) ("InVEST is a suite of free, open-source software models used to map and value the goods and services from nature that sustain and fulfill human life.").

131. *UN-REDD Programme*, UNITED NATIONS, <http://www.un-redd.org/> (last visited Mar. 6, 2018) (creating a financial value for carbon stored in forests and then paying developing countries the social costs saved from their reductions in carbon emissions from deforestation).

132. BURGESS, QIN & LI, *supra* note 126, at 32–35.

133. Natural Capital Project is a partnership between Stanford University, the Chinese Academy of Sciences, the University of Minnesota, the Stockholm Resilience Center, The Nature Conservancy, and the World Wildlife Fund that works to improve the well-being of all people and nature by motivating greater and more targeted natural capital investments. *Who We Are*, NAT. CAPITAL PROJECT, <https://naturalcapitalproject.stanford.edu/what-is-natural-capital/#who-we-are> (last visited Apr. 6, 2019).

134. *What is InVEST*, *supra* note 130.

sequestered) or economic terms (e.g., net present value of that carbon sequestered)."¹³⁵

Burgess' study found that InVEST was one of the most useful platforms to analyze the value of mangroves in Ecuador, as it first calculated the amount of biophysical goods the mangroves produced, then estimated the social benefits generated from the mangroves, and finally converted these into market based values, social preferences, and coefficients adopted from other studies.¹³⁶ InVEST also allows users to "adjust and manipulate the assumptions used in the model, thereby allowing the measurement of ecosystem services under different natural or socio-economic conditions."¹³⁷ Using InVEST the study calculated that "the current mangroves in Ecuador can sequester over twenty three metric tons of carbon over 20 years, which will avoid a social cost of \$378 million."¹³⁸

E. ECOSYSTEM SERVICES IN THE LAW TODAY

Ecosystem services are not a new concept. Since the late 1990s there has been a growing volume of literature in the area.¹³⁹ Early on, scholarship focused on explanations on what ecosystem services were, debates over proper valuation methods, and advocating for the application of ecosystem services in ecological management.¹⁴⁰ It has since evolved into calls for the incorporation of ecosystem services into decision making, common law claims, and marketplaces to pay for ecosystem services.¹⁴¹

135. *Id.*

136. BURGESS, QIN & LI, *supra* note 126, at 20.

137. *What is InVEST*, *supra* note 130.

138. BURGESS, QIN & LI, *supra* note 126, at 33.

139. Sharon et al., *supra* note 112, at 11 ("[A] search for the term 'ecosystem services' in Westlaw's Law Reviews and Journals database shows that the number of articles using the term grew from 16 to 1427 in the twenty-year time span from 1995 to 2015.").

140. See Salzman, *supra* note 12, at 887–88 (explaining how our very survival depends on the services that Earth's ecosystem provides).

141. See SALZMAN, *supra* note 105, at 15, 20–40 (describing how successful payment for ecosystem services markets can be designed). For a detailed comprehensive review of the world's payment for ecosystem services programs, see generally James Salzman et al., *The Global Status and Trends of Payments for Ecosystem Services*, 1 NATURE SUSTAINABILITY 136, 136 (2018) ("In economic terms, PES [payments for ecosystem services] seeks to internalize the positive externalities (that is, the third-party benefits) generated by natural systems, creating incentives for landholder behavior that ensures service provision.").

Ecosystem services have also started to appear in different areas of the law, in the form of federal decision making,¹⁴² natural resource damage assessments,¹⁴³ and settlement and damage calculation frameworks.¹⁴⁴ Even more recently “[p]laintiffs have successfully used ecosystem services terminology to express the form of injury needed to establish standing.”¹⁴⁵ In *Ellis v. Bradbury*,¹⁴⁶ Plaintiffs alleged standing by describing the loss of ecosystem services that would result from EPA’s continued approval of pesticides, including lost utilization of habitats that the impacted pollinators provided.¹⁴⁷ The Court held that these interests were sufficient to confer standing.¹⁴⁸

142. See OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, MEMORANDUM FOR EXECUTIVE DEPARTMENTS & AGENCIES ON INCORPORATING ECOSYSTEM SERVICES INTO FEDERAL DECISION MAKING (2015), <https://obamawhitehouse.archives.gov/sites/default/files/omb/memoranda/2016/m-16-01.pdf> (directing “agencies to develop and institutionalize policies to promote consideration of ecosystem services, where appropriate and practicable, in planning, investments, and regulatory contexts.”).

143. A codified system of recovery for ecosystem services exists under six environmental federal statutes: CERCLA; CWA; OPA; NMSA and; PSRPA. Karen Bradshaw, *Settling for Natural Resource Damages*, 40 HARV. ENVTL. L. REV. 211, 227 (2016).

144. In *Certain Activities Carried Out by Nicaragua in the Border Area*, the International Court of Justice (“ICJ”) carefully considered an environmental damages compensation lawsuit against Nicaragua for lost ecosystem services resulting from degradation of 6.3 hectares of wetland 300 uprooted trees. Jim Salzman, *International Court of Justice Recognizes and Values Ecosystem Services (Sort of)*, LEGALPLANET (Feb. 6, 2018), <http://legalplanet.org/2018/02/06/international-court-of-justice-recognizes-and-values-ecosystem-services-sort-of/> (summarizing the case and explaining its importance for expansion of ecosystem services in the law). Earth Economics, a natural capital valuation company, even offers workshops on how to apply ESV to calculate legal damage assessments. *Workshops and Training*, EARTH ECON., <http://www.earthconomics.org/workshops-and-training> (last visited Mar. 6, 2019).

145. Sharon et al., *supra* note 112, at 13.

146. 2014 WL 1569271 (N.D. Cal. Mar. 21, 2013).

147. Complaint at ¶ 32, *Ellis v. Bradbury*, No. C131266, 2014 WL 1569271 (No. C131266), 2013 WL 1164622 (N.D. Cal. Mar. 21, 2013). (“Plaintiffs and their members have personally visited the ranges of directly impacted ESA-listed invertebrates’ and ‘enjoy utilizing those species for recreational, aesthetic, and other uses, and intend to continue to visit those habitats and enjoy those species and the ecosystem services they provide.”).

148. *Ellis v. Bradbury*, 2014 WL 1569271, at *13–14 (N.D. Cal. Mar. 21, 2013).

However, in *Public Employees for Environmental Responsibility v. Schroer* ("PEER") the Court dismissed plaintiff's complaint that the Tennessee Department of Transportation's failure to comply with its CWA 404 permit wetland mitigation plan was harming his aesthetic, recreational, and wildlife preservation interests in Cherokee Lake.¹⁴⁹ The Plaintiff attempted to relate his injury to the loss of ecosystem services the wetlands in question provide to Cherokee Lake.¹⁵⁰ The Court found that plaintiff had failed to demonstrate an actual individualized injury as opposed to a generalized grievance.¹⁵¹

A study reviewing cases in common law countries that addressed the concept of ecosystem services explained that substantial differences between the two plaintiffs standing claims resulted in the opposite results—namely the "nature of the proceeding, the alleged harm, and the resource at stake."¹⁵² In *Ellis* the plaintiffs used the ecosystem service terminology to describe protected interests that have long been recognized as conferring standing (recreational, aesthetic, existence value, and pollination interests).¹⁵³ However, in *PEER* the plaintiffs used the ecosystem services terminology to describe a form of injury not a protected interest.¹⁵⁴ Comparing these two cases, the study concluded that

plaintiffs seeking to establish standing based on assertions of a factual link between (1) a reduction in ecosystem services . . . and (2) a concrete injury to a specific individual, should put forward careful and specific allegations that tie the harmful action as closely as possible to the alleged injury.¹⁵⁵

149. *Pub. Emps. for Envtl. Responsibility v. Schroer*, No. 3:14-cv-589-HBG, 2017 WL 943942, at *5 (E.D. Tenn., 2017) (quoting Plaintiff's Declaration) ("I am concerned that the insufficiency of the wetlands mitigation at issue in this case could be affecting the health of Cherokee lake and interfering with my aesthetic, recreational and wildlife preservation interest in this river system.").

150. *Id.*

151. *Id.*

152. Sharon et al., *supra* note 112, at 14.

153. *See id.*

154. *PEER*, 2017 WL 943942 at *5 (alleging damage to ecosystem services from degradation of wetlands that helped support the health and viability of the Cherokee watershed where plaintiff recreated).

155. Sharon et al., *supra* note 112, at 14.

II. ANALYSIS

While the three common standing theories discussed in Section I—traditional standing theory, ecosystem nexus approach, and intrinsic value of nature theory—all have their strengths, they are each limited by their applicable scope and ability to prove an “actual or imminent” and “concrete and particularized” injury-in-fact. Section A will highlight the circumstances and scenarios where each of the three standing proposals has failed. Applying ESVs as a tool to remedy these gaps provides a potential solution to see fewer environmental lawsuits dismissed under the Article III standing doctrine. Section B will provide examples for how the application of an ESV methodology in a standings analysis can sufficiently meet the three elements of an injury-in-fact: (i) actual or imminent; (ii) concrete; and; (iii) particularized. Section C will analyze the potential for ESVs to remedy the gaps found in each one of the standing proposals described by this Note by applying it to a scenario where the commonly used theories have previously failed.

A. LIMITATIONS OF PRIOR PROPOSALS TO ESTABLISH ENVIRONMENTAL STANDING

- i. The traditional standing theory often fails to find a plaintiff who has suffered a concrete harm and an individual, not generalized, grievance.

Under the traditional standing theory, public interest organizations, like Sierra Club or Defenders of Wildlife, look for members of their organizations that will be personally and adversely affected by a federal action targeting the environment. Alternatively, they look for members who have already experienced environmental harm from a potential defendant. Although the traditional environmental standing theory is often sufficient, it has its limitations and weaknesses. For example, it can be difficult to find the “right” plaintiff for cases in which an environmental harm occurs in a remote area or to a rare species that does not directly relate to a person’s livelihood, research, or recreational interest.¹⁵⁶

156. See, e.g., Diogo Verissimo & Bob Smith, *When it Comes to Conservation, Are Ugly Animals a Lost Cause*, SMITHSONIAN (June 27, 2017), <https://www.smithsonianmag.com/science-nature/are-ugly-animals-lost-cause->

If it appears no plaintiff is affected by the environmental harm, the organization cannot meet the "injury-in-fact" requirement.¹⁵⁷ This limitation was highlighted in *Lujan* when Defenders of Wildlife were unable to identify a plaintiff the court found was sufficiently injured from the government's funding of international dam projects, despite affidavits from Kelly and Skilbred (both with professional backgrounds in wildlife preservation) that described how they had visited, observed, and planned to return to see endangered species potentially impacted from the Aswan and Mahewali Dam.¹⁵⁸

Furthermore, it can be difficult to prove a particularized environmental harm under the traditional standing theory if the harm is diffuse in nature and affects larger groups of people. A common example of a diffuse environmental harm is air pollution. Upon emission, the air pollutant disperses over wide areas; for example, carbon molecules spread across the entire globe after they are emitted into the air.¹⁵⁹ Although the harm to each individual may be small, the aggregate social costs may be huge; but in order to challenge the polluter in court an individual must be identified with both a particularized and significant injury.¹⁶⁰ Therefore, even if it appears that a plaintiff can be identified under the traditional standing theory that will meet the "actual or imminent" and "concrete" requirements of the standing doctrine, establishing that the injury is *personal* to them can be challenging.

180963807/ (explaining the plight of ugly or obscure threatened and endangered species).

157. See, e.g., *Friends of the Earth, Inc. v. Laidlaw Env'tl Servs., Inc.*, 528 U.S. 167, 181 (2000) ("[It] is not injury to the environment but injury to the plaintiff" that will confer Article III standing).

158. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 564 (1992); see *id.* at 592 (Blackmun, J. dissenting).

159. See Abelkop, *supra* note 1, at 407 (illustrating the problem of a diffuse pollutants like CO₂ emissions in environmental law contexts).

160. See *id.* at 404 ("Diffuse effects do not afflict single and discretely identifiable plaintiffs. Rather, they affect large populations of individuals—many of whom may not even know that they are affected—over wide geographic areas.").

ii. The expansive scope of the ecosystem nexus theory makes it difficult for courts to connect the injury in one portion of the ecosystem to the plaintiff's injury.

Defenders of Wildlife also faced challenges in *Lujan* when it claimed plaintiffs had suffered an adequate injury-in-fact under the "ecosystem nexus theory of standing."¹⁶¹ The Supreme Court dismissed this theory as being "inelegantly styled" and "inconsistent" with its precedent that held an injury stemming from environmental damages had to occur in an area *actually affected* by the challenged activity and not an area roughly "in the vicinity" of it.¹⁶² Despite Defenders' efforts to broaden environmental standing to account for the interconnected characteristics of ecosystems and nature,¹⁶³ the Court found that this was too broad an expansion of the standing doctrine.¹⁶⁴

Justice Blackmun's dissent in *Lujan* illustrates the exact problems with the Supreme Court's rejection of the ecosystem nexus theory:

Many environmental injuries, however, cause harm distant from the area immediately affected by the challenged action. Environmental destruction may affect animals traveling over vast geographical ranges, *see, e.g., Japan Whaling Assn. v. American Cetacean Society*, 478 U.S. 221, 106 S.Ct. 2860, 92 L.Ed.2d 166 (1986) (harm to American whale watchers from Japanese whaling activities), or rivers running long geographical courses, *see, e.g., Arkansas v. Oklahoma*, 503 U.S. 91, 112 S.Ct. 1046, 117 L.Ed.2d 239 (1992) (harm to Oklahoma residents from wastewater treatment plant 39 miles from border).¹⁶⁵

Damages in one portion of an ecosystem can ricochet, causing distant yet immense and significant harm to species, aesthetic value, recreational lands, and more.¹⁶⁶ If a plaintiff is

161. *Lujan*, 504 U.S. at 565 (dismissing plaintiffs' alternative theories of standing).

162. *Id.* at 565–66 (citing *Lujan v. Nat'l Wildlife Fed'n*, 497 U.S. 871, 887–89 (1990)).

163. *See id.* at 565; *see also* Andrew Becker, *Four Basic Components of an Ecosystem*, SCIENCING (Apr. 23, 2018), <https://sciencing.com/four-basic-components-ecosystem-9557.html> ("Ecosystems represent the interconnected nature of living organisms and their world.").

164. *Lujan*, 504 U.S. at 565.

165. *Id.* at 594 (Blackmun, J. dissenting).

166. *See id.* (explaining how pollution can spread far from the initial area of discharge and yet still cause significant damages); *see also Forest Die-Offs Ricochet to Distant Ecosystems*, NAT'L SCI. FOUND. (Nov. 16, 2016), https://www.nsf.gov/news/news_summ.jsp?cntn_id=190154 ("According to a paper published today in the journal *PLOS ONE*, wiping out an entire forest

required to show geographical proximity under an ecosystem nexus theory, many environmental harms and plaintiffs who wish to prevent them will not see their day in court. As Blackmun's dissent states, the majority's opinion could be read as precluding litigants who fail to "use the precise or exact site where animals are slaughtered or where toxic waste is dumped into a river" as a basis for standing.¹⁶⁷

iii. Because of the potential breadth of standing under the intrinsic value of nature theory, courts are hesitant to grant legal rights to nature.

The last common standing theory discussed by this Note is the intrinsic value of nature theory which argues that an injury to animals, the environment, or natural resources should confer standing without requiring a link to a human injury or enterprise.¹⁶⁸ If the natural world has intrinsic value, then it should also be granted the ability to sue in its own right.¹⁶⁹ This theory has potential to be the most protective of nature.¹⁷⁰ After all, if nature has intrinsic value then it cannot be replaced with a man-made or artificial resource that accomplishes the same thing.¹⁷¹ Unfortunately, while this theory is exalted by those as

can have significant effects on global climate patterns and alter vegetation on the other side of the world.").

167. *Lujan*, 504 U.S. at 595 (Blackmun, J. dissenting).

168. See Susan Emmenegger & Axel Tschentscher, *Taking Nature's Rights Seriously: The Long Way to Biocentrism in Environmental Law*, 6 GEO. INT'L ENVTL. L. REV. 545, 550 ("In the third stage [of international environmental law development], the anthropocentric approach is transcended by the recognition of an intrinsic value of nature, i.e. a value independent of human interest.").

169. See Stone, *supra* note 92, at 456 (proposing that legal rights should be given to natural objects and "the natural environment as a whole").

170. From an ethical perspective, it is also the theory this Author is most inclined to agree with.

171. See Ronald Sandler, *Intrinsic Value, Ecology, and Conservation*, NATURE, <https://www.nature.com/scitable/knowledge/library/intrinsic-value-ecology-and-conservation-25815400> (last visited Jan. 23, 2019) (discussing why the fields of ecology and conservation should be guided by a theory recognizing the intrinsic value of nature).

high as Pope Francis¹⁷² and has seen success in New Zealand¹⁷³ and Ecuador,¹⁷⁴ it has failed to achieve similar recognition in the American court system.¹⁷⁵

There are a number of reasons why America's judiciary has chosen not to follow the path of these other nations. Trayce A. Hockstad discussed common arguments and philosophical difficulties the intrinsic value of nature theory imposes in her Note, *Rats and Trees Need Lawyers Too: Community Responsibility in Deodand Practice and Modern Environmentalism*.¹⁷⁶ According to Hockstad, humanity has long distinguished itself from animals and nature based on humankind's rationality and free will.¹⁷⁷ By granting nature inherent legal rights, Hockstad argues, we would skew these long-held distinctions.¹⁷⁸ This would inevitably lead to debates and arguments over the varying degrees of autonomy different species hold.¹⁷⁹

172. See Pope Francis, Encyclical Letter, *Laudato Si'* of the Holy Father Francis on Care for Our Common Home ¶ 84 (May 24, 2015), http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html ("Each creature has its own purpose. None is superfluous. The entire material universe speaks of God's love, his boundless affection for us. Soil, water, mountains: everything is, as it were, a caress of God.").

173. See Tanasescu, *supra* note 99 (explaining how New Zealand made the Whanganui River a person under law).

174. See CONSTITUCIÓN DE LA REPÚBLICA DEL ECUADOR [CONSTITUTION OF THE REPUBLIC OF ECUADOR], Oct. 20, 2008, arts. 71–74.

175. See, e.g., *Colo. River Ecosystem v. Colorado*, No. 1:17-cv-02316, 2017 WL 4284548 (D. Colo. Sept. 25, 2017) (threatening sanctions and disbarment if case not withdrawn). *But see*, *Order to Show Cause, The Nonhuman Rights Project v. Breheny*, No. 18-45164 (Nov. 16, 2018), <https://www.courthousenews.com/ny-judge-grants-habeas-order-for-bronx-zoo-elephant/> (follow "order" hyperlink) (ordering respondent, Executive Vice President of Bronx Zoo, to show cause why Happy, an elephant at the Bronx Zoo, should not be released from Respondent's custody to an appropriate sanctuary).

176. Hockstad, *supra* note 36, at 122–25.

177. *Id.* at 123.

178. *Id.*

179. See, e.g., Christine Stuart, *NY Judge Grants Habeas Order for Bronx Zoo Elephant*, COURTHOUSE NEWS SERV. (Nov. 19, 2018), <https://www.courthousenews.com/ny-judge-grants-habeas-order-for-bronx-zoo-elephant/> (explaining how the Nonhuman Rights Project relied on Happy's cognitive abilities—she was the first elephant known to successfully pass the self-recognition mirror test—as reasoning for why she should be protected from being labeled a "thing" and granted a habeas petition to free her from the confines of the Bronx zoo).

Another reason courts have not accepted the intrinsic value of nature theory is based on their deference to states sovereignty. In the Complaint filed on behalf of Colorado's River Ecosystem, the concern over granting a river in Colorado the rights to sue in its own name centered around the prerogatives of the state of Colorado as a sovereign entity.¹⁸⁰ Few, if any, courts would wish to adopt a legal theory that could restrict the sovereignty of the state or federal government to enact policies and laws for fear of harming natural resources. Indeed, the courts made their opposition to this theory known when the attorney was forced to withdraw the suit under threats of sanctions and disbarment.¹⁸¹

The potential expansive scope of an intrinsic value of nature theory could send many judges off on a "parade of horrors" analysis as well.¹⁸² One can easily imagine a Supreme Court Justice partaking in the familiar practice of pushing an attorney to see how far their legal theory could be stretched.¹⁸³ For example, a court may ask, "if a river has standing in its own right to sue the government for failure to protect its rights to flow what is to stop a 'concerned citizen' from bringing suit on behalf of a squirrel that was negligently run over?"¹⁸⁴

180. See Complaint at ¶ 4, *Colorado River Ecosystem v. Colorado*, No. 1:17-cv-02316, 2017 WL 4284548 (D. Colo. Sep. 25, 2017); Walker, *supra* note 103 (explaining the trajectory of the lawsuit).

181. See Walker, *supra* note 103 (reporting on the lawyer's threats of sanctions and disbarment from the Colorado Attorney General's Office).

182. See Ben Zimmer, *Where did the Supreme Court get its 'Parade of Horrors'?*, BOSTON GLOBE (July 1, 2012), <https://www.bostonglobe.com/ideas/2012/06/30/where-did-supreme-court-get-its-parade-horrors-/Y0jnIscamtgPEzO0PdtL9N/story.html> (explaining the origins and providing examples of the "parade of horrors" expression in legal analysis).

183. See *id.*

184. Cf. *Nat'l Fed'n of Indep. Bus. v. Sebelius*, 567 U.S. 519, 558 (2012) (explaining the courts concern that upholding the individual mandate of the Affordable Care Act on the basis of commerce clause grounds would expand Congress' power to the point that it could mandate individual's purchase broccoli for their "own sake"); Transcript of Oral Argument at 13, *Dep't of Health & Human Services v. Florida*, (No. 11-398) (U.S. 2012), https://www.supremecourt.gov/oral_arguments/argument_transcripts/2011/11-398-Tuesday.pdf ("JUSTICE SCALIA: Could you define the market—everybody has to buy food sooner or later. So, you define the market as food; therefore, everybody's in the market; therefore, you can make people buy broccoli.").

B. ESTABLISHING STANDING THROUGH VALUATIONS OF ECOSYSTEM SERVICES.

Because of the difficulties plaintiffs face in establishing a sufficient injury-in-fact under the standing doctrine, litigators should look to ESVs to fill in the gaps and compliment their standing claims. As James Salzman stated in 1997, “[a]s our understanding of ecological services develops, however, it well may be possible with a degree of certainty to establish connections between identifiable injuries and specific harms to services such as pollination or water retention.”¹⁸⁵ Twenty-two years later, we are now at a point where that degree of certainty can be established.

- i. By valuing lost or damaged ecosystem services a plaintiff can establish an actual or imminent and concrete and particularized injury-in-fact.

In an article that compiled cases in common law countries that discussed ecosystem services (either by name or theory) the authors made the recommendation that all ecosystem service based standing claims use the terminology only to refer to an already legally cognizable interest—such as aesthetics, recreation, or existence values.¹⁸⁶ “[R]eframing *recognized* protected environmental interests as ecosystem services holds more potential than introducing novel ecosystem services-based legal theories.”¹⁸⁷ Despite this warning, this Note proposes the use of ecosystem service valuation methodologies as a tool to link damages to ecosystem services to an “actual or imminent” and “concrete and particularized” injury-in-fact. Instead of creating a novel ecosystem services based legal standing theory, this approach merely applies an already well accepted analytical framework to a new area of the law. Ecosystem service valuation methodologies, models, and platforms address some of the limitations found in the common standing legal theories because it puts environmental harms into a language courts already understand—monetary damages.¹⁸⁸

185. Salzman, *supra* note 12, at 901.

186. Sharon et al., *supra* note 112, at 14.

187. *Id.*

188. Civil litigation often involves lawsuits centered around claims for monetary damages stemming from tort claims, contract breaches, and the like. See, e.g., WEINBERG, *supra* note 44, § 11B.03(1) (“Standing to institute a legal

a. Actual or Imminent Injury

The first thing to establish in a standing analysis is an actual or imminent injury that is not conjectural or hypothetical.¹⁸⁹ Using ESV methodologies and platforms described in this Note¹⁹⁰ a plaintiff can link conduct by the defendant to actual injuries stemming from a loss of ecosystem services in the present moment, even if some of the effects will happen in the future. For example, coastal habitats can act as buffer zones to provide flood prevention and protection from storms.¹⁹¹ The development of these buffer zones can increase the severity, likelihood, and frequency of flooding and resulting damages.¹⁹²

A plaintiff who owns property in a flood plain that was protected by coastal habitats that were subsequently developed can allege a loss in flood mitigation benefits that the coastal habitat provided to their property using an ESV approach.¹⁹³ The plaintiff can then convert the loss of flood protection into actual monetary damages.¹⁹⁴ An ESV approach thus allows the plaintiff to allege her injury in the form of a lost pecuniary interest in the present. This saves the plaintiff from having to argue that her injury-in-fact is based on an increased risk of harm occurring—an argument which has not fared well in the court system.¹⁹⁵

action is a vital issue in environmental litigation, where plaintiffs often lack the pecuniary injury that furnishes standing in most civil litigation.”).

189. See *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560 (1992).

190. See *supra* Part I.D.iii.

191. See NAT. CAPITAL PROJECT, INVEST USER GUIDE: COASTAL VULNERABILITY MODEL, http://data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/coastal_vulnerability.html (last visited Jan. 25, 2019) [hereinafter INVEST: COASTAL VULNERABILITY MODEL] (“Natural habitats . . . play a vital role in decreasing the impacts of coastal hazards that can erode shorelines and harm coastal communities.”).

192. INVEST: COASTAL VULNERABILITY MODEL, *supra* note 192 (“[I]ncreases in anthropogenic pressure can lead to the loss and degradation of coastal ecosystems and their ability to provide protection for humans during storms.”).

193. See *e.g., id.* (providing a model to calculate the lost protection coastal ecosystem provides following their development or degradation).

194. See *id.*

195. See *Fero v. Excellus Health Plan, Inc.*, 236 F. Supp. 3d 735, 753 (holding that increased risk of future identity theft was not an “actual or imminent” or “concrete” injury).

Although ESVs can help prove a plaintiff is a lot closer to an actual or imminent injury, it still has its temporal limits. For example, certain damages from climate change will not happen until a hundred or more years from now.¹⁹⁶ Attempts to protect future generations from these harms by linking the degradation of ecosystems to a loss in carbon sequestration benefits these future generations will not receive will likely be too much of a temporal stretch for a court to accept.¹⁹⁷

The D.C. Circuit Court highlighted this issue in *Wildearth Guardians v. Salazar*.¹⁹⁸ Plaintiffs attempted to challenge the government's decision to lease public lands for coal mining operations based on the impact the increased greenhouse gas emissions (GHGe) would have on climate change.¹⁹⁹ However, the Court found that the plaintiffs failed to prove a demonstrable increase in risk to their recreational, aesthetic, or economic interests based on the government's actions because the harm would occur sometime in the future and depended "on the behavior of countless third parties."²⁰⁰ Therefore, while ESV can provide a useful tool in many cases to allege standing, it is not without its own limitations.

b. Concrete Injury

For another illustration that was given by J.B. Ruhl in his speech at St. Thomas University Law School's distinguished speakers series—imagine a plaintiff owns and operates a commercial apple orchard.²⁰¹ Next to the apple orchard is a significant portion of undeveloped land that contains natural

196. *Future of Climate Change*, U.S. ENVTL PROTECTION AGENCY, https://19january2017snapshot.epa.gov/climate-change-science/future-climate-change_.html (last updated Dec. 27, 2016) (explaining the potential impacts of climate change 100 years from now).

197. *Cf. Fero*, 236 F. Supp. 3d at 753.

198. 880 F. Supp. 2d 77 (D.C. Cir. 2012).

199. *Id.* at 79, 84.

200. *Id.* at 85–86.

201. J.B. Ruhl, *Towards of Common Law of Ecosystem Services*, 18 ST. THOMAS L. REV. 1, 15 (2008) (explaining how ecosystem services could be used in nuisance suits: "Lawyers through the ages have had no problem agreeing that odors from a pigsty, or fumes from a copper smelting plant, or chemical pollution of a lake or stream are within the ballpark of nuisance so defined. Why should matters be any different when one person's use of land severs the flow of economically valuable ecosystem services to another person's use of land?").

plant species and habitat that supports pollinators like bees.²⁰² If this property is purchased by a developer that plans to turn the undeveloped land into a residential complex, the apple orchard could lose incredibly important ecosystem services from the resulting loss of pollinators.²⁰³ Harnessing existing ESV platforms, the plaintiff's potential damages can be measured as a reduction in apple yield and the lost revenue from this reduced crop yield.²⁰⁴

The Natural Capital Project already has a "pollinator abundance: crop pollination" model that can be used to measure reduced crop yields based on the change in pollinator habitat on its open source platform.²⁰⁵ As the InVEST model user guide explains:

The InVEST pollination model focuses on wild bees as a key animal pollinator. It uses estimates of the availability of nest sites and floral resources within bee flight ranges to derive an index of the abundance of bees nesting on each cell on a landscape (i.e., pollinator supply). It then uses floral resources, and bee foraging activity and flight range information to estimate an index of the abundance of bees visiting each cell. If desired, the model then calculates a simple index of the contribution of these bees to agricultural production, based on bee abundance and crop dependence on pollination. The results can be used to understand changes in crop pollination and crop yield with changes in land use and agricultural management practice.²⁰⁶

With a quantified value of lost apple yields, the plaintiff has proof of an imminent injury that would actually occur as soon as the defendant develops the property.

Despite the strong private property rights recognized in the United States, individuals do not have a right to invade the enjoyment and use of others property.²⁰⁷ With an ESV in hand,

202. *Id.* (laying out a hypothetical scenario comparing traditional nuisance suits effecting apple orchards—e.g., emissions damaging the bark of trees from a neighboring industrial facility—to scenarios, including the one described above, involving a loss of ecosystem services).

203. *Id.* See THE NATURAL CAPITAL PROJECT, INVEST USER GUIDE: POLLINATOR ABUNDANCE: CROP POLLINATION USER GUIDE, INVEST, <http://data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/croppollination.html> (last visited Mar. 6, 2019) ("For bees to persist on a landscape, they need two things: suitable places to nest, and sufficient food (provided by flowers) near their nesting sites.") [hereinafter INVEST: POLLINATOR ABUNDANCE].

204. INVEST: POLLINATOR ABUNDANCE, *supra* note 204.

205. *Id.*

206. *Id.*

207. See *Nuisance*, BLACK'S LAW DICTIONARY (10th ed. 2014).

the owner of the apple orchard would be able to bring a nuisance lawsuit against the defendant alleging a specific injury-in-fact to their crop yield. Even if the court did not grant an injunction against the defendant from developing their property, they could require the defendant to offset the plaintiff's harm through compensation.²⁰⁸ If standing had been used by the defendant to keep the apple orchard owner out of court, she would not have had a chance to challenge the development through a nuisance suit in the first place.

c. Particularized Injury

A legitimate limitation to using ESV as a tool to establish standing may arise when attempting to allege the last element of the injury-in-fact analysis—a particularized injury. As a plaintiff gets closer to proving an actual or imminent and concrete injury based on losses or damages to ecosystem services it may be harder to prove that said injury is particularized. As Ori Sharon and her team discussed in their survey of ecosystem services in common law, “ecosystem services are diffused and, in most cases, benefit a broad, albeit unspecified, group of individuals.”²⁰⁹ Plus, as the Supreme Court averred in *Friends of the Earth, Inc. v. Laidlaw Environmental Services*, it “is not injury to the environment but injury to the plaintiff” that you must show.²¹⁰

This line of reasoning is what prevented the plaintiff in *PEER* from establishing standing.²¹¹ Mr. Stratford, a member of the plaintiff organization, submitted a declaration to the court attesting to the aesthetic, recreational, and cultural values he gained from Cherokee Lake.²¹² Mr. Stratford's concern was that

208. See *Walsh v. Town of Stonington Water Pollution Control Auth.*, 250 Conn. 433 (1999) (granting damages to neighbors of sewage treatment plant for offensive smell that interfered with their use and enjoyment of the property).

209. Sharon et al., *supra* note 112, at 13. But see *United States v. Students Challenging Regulatory Agency Procedures*, 412 U.S. 669, 670 (1973) (accepting showing of injury and specifically noting that courts should not deny standing just because many people suffer the same injury).

210. 528 U.S. 167, 181 (2000)

211. *Pub. Emps. for Envtl. Responsibility v. Schroer*, No. 3:14-cv-589-HBG, 2017 WL 943942, at *5 (E.D. Tenn. 2017) (“Mr. Stratford's Declaration alleges only a generalized grievance and not an actual, individualized injury.”).

212. *Id.* (“My family and I enjoy the beauty of Cherokee Lake every single day, both on and off the water. We frequently boat, fish, entertain, and marvel at the wonder of the lake.”).

the defendant's failure to comply with its wetland permit requirements would reduce the ecosystem services the wetland provided to Cherokee Lake and interfere with his "aesthetic, recreational, and wildlife preservation interest in [the] river system."²¹³ However, the Court's real concern was that the plaintiff failed to *link* the loss in ecosystem services to any *individualized* injury in his declaration.²¹⁴ "As the Defendant noted, Mr. Stratford has not explained how he has been injured or impacted by the wetland mitigation area."²¹⁵

By applying an ESV approach to standing, Mr. Stratford could have alleged with specific detail in his declaration, and with supporting evidence, his particularized aesthetic, recreational, and wildlife preservation interests in the river system that would be affected by defendant's failure to comply with the wetland permit requirements.²¹⁶ For instance, Delaware applied the InVEST model to measure the effect of the states predicted future wetland loss on habitat quality and rarity in Delaware.²¹⁷ A similar valuation technique could have been used to link the defendant's degradation of the wetland in *PEER* to a quantified loss in habitat and species diversity. From here, counsel would merely have to link this quantified loss of wildlife to Mr. Stratford's *particularized* interest in observing wildlife on Cherokee Lake.

This analytical approach would likely have assuaged the Court's concerns that there was no connection between the

213. *Id.*

214. *Id.* ("Mr. Stratford explains how he utilizes the lake, both for recreational use and aesthetic value, but does not explain how the failure to mitigate the wetlands *affects* his recreational use or aesthetic value.").

215. *Id.* at *6.

216. See *Wetland Ecosystem Services*, RAMSAR CONVENTION ON WETLANDS (Aug. 15, 2011), http://archive.ramsar.org/cda/en/ramsar-pubs-info-ecosystem-services/main/ramsar/1-30-103%5E24258_4000_0 (listing ten ecosystem services wetlands provide: flood control, groundwater replenishment, shoreline stabilization & storm protection, sediment & nutrient retention and export, water purification, reservoirs of biodiversity, wetland products, cultural values, recreation & tourism, climate change mitigation and adaptation.).

217. See INDUS. ECON., INC., ECONOMIC VALUATION OF WETLAND ECOSYSTEM SERVICES IN DELAWARE 5-1 (2011), <http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/Economic%20Evaluation%20of%20Wetland%20Ecosystem%20Services%20in%20Delaware.pdf> ("[C]onversion of wetland to a non-habitat land may result in "edge effects" on neighboring habitats. That is, where wetlands are replaced by land uses that fragment or pollute neighboring habitats, broader habitat degradation may occur across the landscape.").

defendant's failure to mitigate the wetland degradation and Mr. Stratford's particularized interest in Cherokee Lake. While everyone would have suffered from the lost ecosystem services that the wetland provided, by performing an ESV Mr. Stratford's counsel would have been able to show the court the particular ecosystem services that Mr. Stratford had an interest in based on his recreational and aesthetic use of Cherokee Lake. *PEER* also shows the importance of applying ESV up front in the pleading stage as plaintiffs attempt to assert specific concrete and particularized injuries in its brief was too little too late for the Court.²¹⁸

However, there will still likely be environmental harms that are so diffuse and do not affect *one* individual person enough to rise to the level of an actual injury-in-fact with or without ESVs. Lawsuits arising from climate change damages may provide an example based on the diffuse nature of GHGs.²¹⁹ While some individuals may be able to claim a specific injury from climate change in the future (e.g. beachfront property owners who will lose land due to rising sea levels),²²⁰ for many a cognizable "injury-in-fact" will remain allusive.

For example, in *Center for Biological Diversity v. U.S. Department of Interior* the non-profit organization attempted to challenge DOI's approval of a five-year program to expand offshore oil and gas leasing near Alaska.²²¹ The plaintiffs attempted to allege injury from future climate change damages in the Arctic stemming from the leasing program.²²² The Court

218. *Pub. Emps. for Envtl. Responsibility*, 2017 WL 943942 at *6 (explaining that a plaintiff "must set forth by affidavit or other evidence specific facts, which for purposes of the summary judgment motion, will be taken as true.") (quoting *McKay v. Federspiel*, 823 F.3d 862, 867 (6th Cir. 2016)).

219. *Cf., e.g., Friends of the Earth, Inc. v. Watson*, No. C 02-4106, 2005 WL2035596, at *1 (N.D. Cal. Aug. 23, 2005) (holding that plaintiffs established standing to challenge the defendants' actions which contribute to global warming and continuing adverse environmental impacts).

220. *See, e.g., Wash. Envtl. Council v. Bellon*, 732 F.3d 1131, 1141 (9th Cir. 2013) (finding that individual plaintiffs successfully satisfied the first prong of specific and concrete injuries by showing, for example, how their properties had been damaged by flooding and how their health had been negatively affected by climate changes).

221. 563 F.3d 466, 471–72 (D.C. Cir. 2009).

222. *Id.* at 476 ("Petitioners contend that, absent Interior's approval of the Program, the OCS areas at issue would not be subject to environmental impacts allegedly brought about by climate change associated with the burning of fossil fuels produced under the Program.").

dismissed this claim because the harm to the individual plaintiffs from climate change was not more personal to them than the rest of the world's population.²²³ In the future, models may become accurate and valuation methods advanced enough that an individual's damages from climate change can be linked to specific GHGe. Until that point, individuals may have to rely on states and cities to vindicate their collective damages from climate change.²²⁴

ii. Application of ESVs can address limitations found in three commonly proposed environmental standing theories.

Each of the prior environmental standing proposals discussed in this Note—traditional standing theory, ecosystem nexus theory, and the intrinsic value of nature theory—has its merits.²²⁵ However, each theory also has limitations that have prevented its application across the broad spectrum of environmental harms that occur.²²⁶ Through proper applications, environmental lawyers can use ESVs as a tool to help overcome the limitations courts have found with each of these common proposals. By tweaking the way an injury is alleged, and using tested analytical methodologies, ESVs can help prove that a plaintiff has indeed suffered an injury-in-fact while still relying on the underlying theory of each proposal.

a. Traditional Standing Theory

As discussed *supra* one limitation under the traditional standing theory is the inability of public interest organizations to find the "right member plaintiff" for harm impacting remote, rare, or unpopular environmental resources or species.²²⁷ If a potential defendant is harming the environment, courts will be

223. *Id.* at 478 ("[C]limate change is a harm that is shared by humanity at large, and the redress that Petitioners seek—to prevent an increase in global temperature—is not focused any more on these petitioners than it is on the remainder of the world's population.").

224. See Umair Irfan, *Pay Attention to the Growing Wave of Climate Change Lawsuits*, VOX (Feb. 22, 2019), <https://www.vox.com/energy-and-environment/2019/2/22/17140166/climate-change-lawsuit-exxon-juliana-liability-kids> (providing background on a rise in climate change lawsuits filed by states and cities against oil and gas companies for current and future damages related to climate change).

225. See *supra* Part I.C.

226. See *supra* Part II.A.

227. See *supra* Part II.A.i.

of no service in stopping the damages unless a plaintiff is identified whose interests in some way are directly injured by the environmental harm.²²⁸ However, from an ethical approach, environmental resources should not be saved from degradation only if they are popular, well-studied, or in the general public's eyesight.²²⁹ Applying an ESV methodology to standing, plaintiffs will be able to bridge the gap between a harm to a remote area or species and an injury-in-fact suffered by the plaintiff.

Looking to *Lujan*, Defenders of Wildlife were unable to identify a plaintiff whom the court found sufficiently injured from the government's funding of international dam projects, despite two plaintiffs' testimony that they had visited and observed endangered species potentially impacted from the projects and had future (albeit not concrete) plans to return.²³⁰ Applying an ESV model, potential plaintiffs could measure the projected impacts on ecosystem services from the construction of the Aswan and Mahewali Dams and demonstrate the negative effects the dams would have on their interests by charting, measuring, and illustrating the resulting ripple effects across the relevant ecosystem. For instance, one ecosystem services assessment of a proposed dam in the Mekong showed that "[f]ull development of proposed hydropower dams will further reduce sediment supply to less than 10% of the natural rate."²³¹ Sediment provides vital ecosystem services including the prevention of delta erosion where over half of Vietnam's agriculture is grown.²³² By identifying and broadening the scope

228. See, e.g., *Pub. Emps. for Envtl. Responsibility v. Schroer*, No. 3:14-cv-589-HBG, 2017 WL 943942, at *5 (E.D. Tenn. Mar. 9, 2017) (citing *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs.*, 528 U.S. 167, 181 (2000)) (explaining the injury requirement environmental plaintiffs must demonstrate to establish standing to sue).

229. See LEOPOLD, *supra* note 95, at 262 ("A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.").

230. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 562–67 (1992).

231. Jeff Opperman, *Gaining Power but Losing Ground? Balancing Hydropower and Sand Supply on the Irrawaddy*, FORBES (Mar. 7, 2018), <https://www.forbes.com/sites/jeffopperman/2018/03/07/gaining-power-but-losing-ground-balancing-hydropower-and-sand-supply-on-the-irrawaddy/#193851503dd3>.

232. *Id.* ("The Mekong Delta is home to 17 million people and supports phenomenally productive agriculture that grows half of Vietnam's staple crops and 90% of its rice exports. Overall, the Delta underpins more than a quarter of Vietnam's GDP.").

of the potential damages to ecosystem services that could arise from a hydropower project—like the Aswan, Mahewali, or Mekong River Dams—and then calculating the financial value of these lost services, the potential pool of plaintiffs with an injury-in-fact grows considerably.

However, there will be some aspects of nature or species that do not provide any benefits to humans in the form of ecosystem services.²³³ There are also species that live in entirely closed off ecosystems.²³⁴ For these resources, it will be impossible to utilize ESVs to find a plaintiff that is sufficiently injured. Arguably, this does not mean that these species or isolated ecosystems are not worth protecting. However, the court doors will remain closed to any case attempting to protect these species or ecosystems for lack of an injury-in-fact under the traditional standing theory using current ESVs.

b. Ecosystem Nexus

Incorporation of ESVs as a tool in standing analyses would similarly have helped address the flaws in plaintiffs' ecosystem nexus theory of standing alleged in *Lujan*. Defenders of Wildlife argued that any person who uses any part of a "contiguous ecosystem" adversely affected by a defendant's acts or omissions has standing even if the activity is located some distance away from the tracts used by the injured person.²³⁵ While the plaintiffs underlying theory was correct from an ecological standpoint—DOI's funding of the Aswan and Mahewali Dams would likely have had adverse and widespread ramifications on the ecosystem as a whole and impacted persons who used or derived benefits from portions of that ecosystem—what was missing for

233. See, e.g., Jonathan E. M. Baillie & Ellen R. Butcher, *Species at a Tipping Point*, in PRICELESS OR WORTHLESS? THE WORLD'S MOST THREATENED SPECIES 24–87 (2012) (providing examples of endangered species that offer no benefits to humans).

234. For example, the Movile Cave in Romania was sealed off from the outside world for 5.5 million years until 1986 when it was discovered. It is full of poisonous gasses yet forty-nine different species have been found in the cave. It is closed off by the Romanian government because of its danger and only 100 people have been allowed inside. See Jasmin Fox Skelly, *The Bizarre Beasts Living in Romania's Poison Cave*, BBC (Sept. 4, 2015), <http://www.bbc.com/earth/story/20150904-the-bizarre-beasts-living-in-romanias-poison-cave>.

235. Brief for the Respondents, *Lujan v. Defs. of Wildlife*, 504 U.S. 555 (1992) (No. 90-1424), 1991 WL 577004, at *27 (Aug. 30, 1991).

the court was a “nexus” between the adverse effect on the “contiguous ecosystem” and the harm the plaintiff suffered.²³⁶ Applying an ESV standing theory, plaintiffs could establish this “nexus” and illustrate to the court the exact injury the plaintiff is suffering.²³⁷

Once again, the InVEST platform shows how an ESV approach could have helped the plaintiffs in *Lujan* establish standing. One of InVEST’s models is the habitat quality model which does not directly monetize biodiversity but instead treats it as an independent attribute of natural systems that can be linked to the quality of the habitat.²³⁸ The model has a number of defined threats (based on the potential land use or land cover) that can be inputted into the assessment to “measure potential changes in habitat extent, quality, and rarity on a landscape.”²³⁹ One of the possible threats that can be mapped in the model is the impact on habitat from “reservoirs and other running water diversions,” both of which result from the construction of dams.²⁴⁰ Other studies have also used ESV methodologies to determine the impacts of hydropower systems on ecosystem services including the social and economic impacts from “altered food-chain dynamics, habitat fragmentation, intrusion of saltwater, displacement of wetland vegetation by upland

236. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 566 (1992) (citing *Lujan v. Nat’l Wildlife Fed’n*, 497 U.S. 871, 887–89 (1990) (holding that the ESA does not extend rights to “persons who use portions of an ecosystem not perceptibly affected by the unlawful act in question.”)).

237. Salzman, *supra* note 12, at 901 (“As our understanding of ecological services develops, however, it well may be possible with a degree of certainty to establish connections between identifiable injuries and specific harms to services such as pollination or water retention.”).

238. NAT. CAPITAL PROJECT, INVEST USER GUIDE: HABITAT QUALITY MODEL, http://data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/habitat_quality.html (last visited Mar. 6, 2019).

239. *Id.*

240. *Id.* (listing the number of species currently endangered from the threat of reservoirs and other water diversions as 161 and the number threatened as 240); see also *The Pros and Cons of Dams*, ARCADIA POWER, <https://blog.arcadiapower.com/pros-cons-dams/> (last visited Mar. 6, 2019) (describing how reservoirs and water divisions from hydropower can damage the environment and highlighting how after the Aswan dam was built—one of the dams in question in *Lujan*—“scientists noticed a marked decline in fish production around the area, as the amount of nutrients and food was now less than before the dam.”).

species, disrupted reproductive patterns for fish and wildlife species, and loss of coastal mangroves.”²⁴¹

If these valuation tools had been available at the time of *Lujan*, Defenders could have established a “nexus” between the Aswan & Mahewali Dams construction and the adverse impacts the dams would have on habitat extent and quality in the *specific* area of the contiguous ecosystem Kelly and Skilbred used to observe the Nile Crocodile, Asian elephant, and leopard, even if the dams were located some distance away.²⁴² This would have assuaged the majority’s fear that the plaintiffs were alleging standing based on their use of a portion of an ecosystem “not perceptibly affected by the unlawful act in question.”²⁴³ Back in 1997 Salzman noted there was a potential application for ecosystem services to establish the nexus Justice Scalia was looking for in *Lujan*, stating that an “[i]ncreased understanding of ecosystem services would . . . justify an ecosystem nexus theory of standing.”²⁴⁴ Furthermore, instead of broadening the scope of federal jurisdiction in potential contravention of Article III and separation of powers principles, the application of an ESV methodology merely provides evidence that the ecosystem nexus theory is valid under the *current* standing doctrine.

c. Intrinsic Value of Nature

Finally, ESVs can help address limitations in the “intrinsic value of nature” standing theory because this methodology puts environmental harm into terms courts already understand—pecuniary or identifiable human interests and monetary damages.²⁴⁵ Attempts to grant natural objects standing in their own right often fail because the judiciary is a human construct created to protect human interests and adjudicate human

241. RICHARD BEILFUSS, INTERNATIONAL RIVERS, A RISKY CLIMATE FOR SOUTHERN AFRICAN HYDRO, ASSESSING HYDROLOGICAL RISKS AND CONSEQUENCES FOR ZAMBEZI RIVER BASIC DAMS 33 (2012), <https://hub.globalccsinstitute.com/sites/default/files/publications/162713/risky-climate-southern-african%E2%80%93hydro-hydrological-risks-consequences-zambezi-river-basin-dams.pdf>.

242. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 563 (1992).

243. *Id.* at 566.

244. Salzman, *supra* note 12, at 902; *see id.* at 901 (“As our understanding of ecological services develops, however, it well may be possible with a degree of certainty to establish connections between identifiable injuries and specific harms to services such as pollination or water retention.”).

245. *See* WEINBERG, *supra* note 44 and accompanying text.

disputes.²⁴⁶ To address the skepticism U.S. courts have taken with the “intrinsic value of nature” standing theory, Hockstad proposed that “litigators should present a more compelling legal and moral narrative by highlighting human interests at stake in the preservation of the natural world instead of downplaying humanity’s relationship to the environment in favor of inflating the proposed interests of non-human objects.”²⁴⁷ Ecosystem services are, by their definition, the benefits that the natural world provides to humans.²⁴⁸ Assessments of these ecosystem services can help litigators “highlight[] [the] human interests at stake in the preservation of the natural world.”²⁴⁹ These assessments, or valuations, can then be used to directly link damages to the natural world to a human injury in order to establish standing.

The lawsuit recently filed in federal district court that attempted to list the Colorado River Ecosystem as a party in its own right can serve as a use case.²⁵⁰ In the plaintiff’s complaint, counsel sought declaratory relief from the Court that the Colorado River was capable of possessing rights similar to a “person,” that it had certain rights to “exist, flourish, regenerate, be restored, and naturally evolve,” and that these rights “establish duties on behalf of the State of Colorado, and all other governments, to respect those rights.”²⁵¹ The plaintiffs then requested the Court to declare that actions taken by the State of Colorado, including permitting of bulkheads at a gold mine that led to a toxic spill, overdrawing water, and the operation of dams violates the rights of the Colorado River Ecosystem.²⁵² Despite this noble effort, the attorney withdrew the complaint at the

246. See Hockstad, *supra* note 36, at 121–22 (conceiving “nature as existing for the purpose of human use and therefore, subservient to humanity’s interests” and recognizing that the “anthropocentric approach in law [] regarded nature as a collection of resources for human use and management”).

247. *Id.* at 127.

248. See Carcamo, *supra* note 104 (“Ecosystem services are benefits that ecosystems provide to humans.”).

249. Hockstad, *supra* note 36, at 127.

250. Complaint at ¶ 4, *Colo. River Ecosystem v. Colorado*, No. 1:17-cv-02316, 2017 WL 4284548 (D. Colo. Sept. 25, 2017) (“Through this action, the Plaintiffs are asking this Court to recognize and declare that the Colorado River is capable of possessing rights similar to a ‘person’ . . .”).

251. *Id.* at ¶ 68.

252. *Id.* at ¶¶ 79, 69, 74, 82, 85(d).

threat of sanctions from the Colorado Attorney General's office.²⁵³

Advancing this difficult legal theory was not necessary, however. The very rights that counsel tried to establish for the Colorado River Ecosystem (the right to exist, flourish, regenerate, be restored, and naturally evolve) and the actions he attempted to hold the State of Colorado liable for all could have been achieved by applying ESVs as a tool to support counsel's standing claims. In fact, Earth Economics published an expansive and detailed report in 2014 on the value of nature in the Colorado River Basin.²⁵⁴ The 117-page report studied the "ecosystem services in the Colorado River Basin" including "potable water, irrigation water, carbon sequestration, flood risk reduction, water filtration, wildlife habitat, soil erosion reduction, soil formation, raw materials, food, recreation, air quality, and aesthetic value" and calculated "the economic value provided by these ecosystems."²⁵⁵ The total value calculated for the eleven ecosystem services throughout the entire river basin was \$56.5 to \$466.6 billion per year, with water supply, and water quality totaling \$7–28 billion alone.²⁵⁶

Within this calculated value of billions of dollars are real humans who derive these monetary benefits in the form of ecosystem services from the Colorado River Basin.²⁵⁷ Surely one

253. See Walker, *supra* note 103 (noting that the Colorado Attorney General's Office threatened to impose financial sanctions and the attorney's disbarment "on the grounds that his 'rights of nature' case is unlawful and frivolous").

254. BATKER ET AL., EARTH ECONOMICS, NATURE'S VALUE IN THE COLORADO RIVER BASIN (2014), <https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/Earth%20Economics%20Colorado%20River%20Basin%20ESV%20FINAL.pdf>.

255. *Id.* at ii.

256. *Id.* at 54, 56 (table 28) (totaling the low and high values for water supply and water quality values inside the 200-foot buffer).

257. See Lily Tomkovic, *A Brief History of Water Rights of the Colorado River*, EDUC. AT THE CTR. FOR WATERSHED SCI. (Feb. 14, 2016), <https://watershed.ucdavis.edu/education/classes/ecogeomorphology-grand-canyon-2016/flogs/brief-history-water-rights-colorado-river> ("Before settlement of Anglos in the West, the River provided the lifeblood to numerable indigenous tribes. Currently, in addition to providing sustenance to indigenous people, the Colorado River provides water to approximately 36 million people, is the host of numerous types of recreation-resulting in a revenue of approximately 26 billion dollars-and generates power through the hydroelectric plants at Glen Canyon and Hoover Dams."); Tom Philpott, *40 Million People Depend on the Colorado River. Now It's Drying Up.*, MOTHERJONES (Aug. 4, 2014),

of these plaintiffs could have brought forward a suit seeking protection of the Colorado Rivers right to exist and flourish based on a loss of ecosystem services caused by a defendant's actions. Furthermore, in a lawsuit seeking to hold the State of Colorado liable for its acts and omissions related to mining permits, dam operation, and excess water allotment a human plaintiff could have established standing by proving a monetary diminishment in the value of their recreation, potable water, irrigation water, aesthetic, or wildlife interests. If counsel for the Colorado River Ecosystem had used an ESV approach to establish standing instead of attempting to extend standing to natural objects based on their "intrinsic value,"²⁵⁸ protection of the Colorado River Basin likely still could have been achieved without resulting in a withdrawal of the complaint to avoid sanctions.²⁵⁹

One limitation that an ESV standing analysis will still struggle with is harm to cultural and spiritual values found in nature. For example, to the Ojibwe wild rice is an important cultural, spiritual, and sacred resource.²⁶⁰ "There is no way to quantify the value of this food to the Anishinaabeg [Ojibwe] people—it feeds the belly and the soul, and is a major source of wealth."²⁶¹ Harms to the environment rooted in cultural and

<https://www.motherjones.com/food/2014/08/southwest-water-crunch-even-worse-we-thought/> ("[T]he Colorado also provides the irrigation that makes the desert bloom in California's Imperial Valley and Arizona's Yuma County—source of more than two-thirds of US winter vegetable production.").

258. Complaint at ¶ 37, *Colorado River Ecosystem v. Colorado*, No. 1:17-cv-02316, 2017 WL 4284548 (D. Colo. Sep. 25, 2017) (imploing the court to "recognize the inherent worth of the natural communities who give us life").

259. Athens, *supra* note 101, at 191 (citing Chris Walker, *Attorney to Withdraw Colorado River Lawsuit Under Threat of Sanctions*, WESTWORD (Dec. 4, 2017), <http://www.westword.com/news/colorado-river-lawsuit-to-be-withdrawn-due-to-potential-sanctions-9746311>).

260. See Dan Gunderson & Chris Julin, *Wild Rice at the Center of a Cultural Dispute*, MINN. PUB. RADIO (Sept. 24, 2002), http://news.minnesota.publicradio.org/features/200209/22_gundersond_wildrice-m/ ("We consider it to be sacred, because it's a gift from the creator", says White Earth elder Earl Hoaglund. "It was foretold in those prophecies that as the ice melted we were to move westward and food would be provided for us on the water. And that's what happened. When we moved into the Wisconsin, Minnesota areas that rice was already there, growing.").

261. Winona LaDuke, *The Long and Honorable Battle of the Ojibwe to Keep Their Wild Rice Wild*, INDIAN COUNTRY TODAY (Nov. 2, 2011), https://newsmaven.io/indiancountrytoday/archive/the-long-and-honorable-battle-of-the-ogibwe-to-keep-their-wild-rice-wild-_dXm7kHqx0-l82Fu2arYLg/.

spiritual value will remain elusive to an ESV approach. It is important to remember that while ecosystem services and their valuations are promising tools in an environmental lawyer's toolbelt, "not everything that can be counted counts, and not everything that counts can be counted."²⁶²

CONCLUSION

Standing has proven to be on the most allusive doctrines for environmental plaintiffs to allege, and a favored defense strategy of government agencies, private individuals, and corporate entities. Despite the valid separation of powers concerns underlying the standing doctrine, federal courts have a duty to exercise their jurisdictional powers and should not abdicate their responsibility as a foundational pillar of our federal government. As Justice Marshall averred "[t]he very essence of civil liberty certainly consists in the right of every individual to claim the protection of the laws whenever he receives an injury."²⁶³

However, because of certain characteristics of environmental harms, including their often diffuse, latent, and rippling nature, courts have struggled with applying the standing doctrine when a plaintiff alleges an injury based on damage to the environment. Without the judiciary's acceptance of environmental harm as a valid injury, plaintiffs are relegated to the political battlefield to seek vindication of their interests where their voices are often lost to the tides of large corporations and market forces.

Thankfully, we have arrived at a point in time where science, data, and robust assessments of ecosystem services can help prove to courts that plaintiffs bringing lawsuits for environmental wrongs really have suffered an injury-in-fact. Ecosystem services provide a useful framework for alleging an injury under the standing doctrine because they identify the benefits, and thus the interests, that humans receive from the natural world. Application of proven models and valuation techniques can place a monetary value on these services. Alternatively, ecosystem service assessments can provide proof of the "nexus" between the environmental harm and damages to

262. WILLIAM BRUCE CAMERON, *INFORMAL SOCIOLOGY: A CASUAL INTRODUCTION TO SOCIOLOGICAL THINKING* 13 (1967).

263. *Marbury v. Madison*, 5 U.S. 137, 163 (1803).

plaintiff's particularized interest. The use and applications for ecosystem services and their valuation have grown considerably; it is high time environmental lawyers look to ESV as a promising tool for their standing battles as well.